

COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Weekly Newspaper

Second-class postage paid at Framingham, Mass. and additional mailing offices ©1983 by CW Communications/Inc.

\$1.50 a copy; \$44/year

October 10, 1983

Vol. XVII, No. 41

Federal Express Plans to Deliver Via Facsimile In Two Hours

By Katherine Hafner
CW Staff

MEMPHIS, Tenn. — Despite its reign over the increasingly competitive overnight delivery market, Federal Express Corp. is still taking risks. The billion-dollar company is planning a new service: a two-hour guaranteed delivery of documents via facsimile transmission.

Dubbed Gemini, the service is expected to go into operation next year between April and July, and with it Federal Express fully expects to find customers willing to pay a premium price for two-hour delivery when they were satisfied with overnight delivery before that and a first-class postage stamp before that.

Chuck Winston, senior vice-president of Federal's Electronic Products Division, said the company does not consider the service facsimile transmission, but "document processing."

"We decided never to get into the fax business in the way it exists today because we don't believe it's right for us," he said. "We're offering full document processing that changes each bit of information on the page into

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Inside

For the third time in recent months, NCR Corp. has been ordered to pay damages to a user of its minicomputers. Page 2.

Fortune Systems Corp. called a press conference last week to announce two new systems. In a surprise move, the company also revealed that it had replaced its president and co-founder. Page 4.

Claiming that it will free those Fortune 1,000 users enslaved by their IBM mainframes, Spartacus Computers, Inc. has introduced an IBM 370-compatible distributed processor. Page 4.

Control Data Corp. has unveiled a processor that can be linked to its Cyber 170 supercomputers to attain speeds up to 16G operation/sec. Page 8.

The U.S. Postal Service has finally implemented its nine-digit Zip Code. Page 11.

The Computer and Business Equipment Manufacturers Association has rejected direct government planning and intervention in the economy. Page 91.

Office Image Processor, Gateway to IBM Nets Introduced by Wang

By Jim Bartimo
CW Staff

LOWELL, Mass. — Calling them "the most important products in the company's history," Wang Laboratories, Inc. last week announced an imaging processor that can be used to digitize entire documents and store them in a computer's memory and a variety of communications software.

The software, which includes a gateway to IBM networks, can be used to send digitized images to both Wang and non-Wang computer systems, as well as make connections to other vendor environments.

Also introduced were: an upgrade to Wang's word processing software, an applications development tool, a relational data base and documentation for its word processing document format options for the Wang Professional Computer (see stories on Page 6).

The Wang Professional Image Computer uses a camera to scan images from a document and digitizes those images. Once digitized, the image can be displayed, stored, retrieved, altered, merged with text and communicated. It is said to be the first office system to incorporate

imaging technology in its design.

As part of the Professional Computer line, the PIC includes a desktop camera-like scanner to digitize images from a sheet of paper, a high-resolution monitor and a desktop thermal printer. The system is designed to handle information that includes pictures, handwritten notes, margin notations on correspondence, drawings and text.

The PIC system is said to be fully integrated with the Wang VS/IIS, VS/Alliance, OIS and Alliance lines of office computers. The image processor ranges in price from \$14,965 to \$26,730, depending on options added, and will be available in February 1984.

Working in concert with the PIC and also introduced was the Wang Office, a series of network-based software applications for Wang systems said to provide time and task management, communications and information management tools. The Wang Office includes electronic mail, directory services, time management and file management, a Wang spokesman said.

Available on the VS, OIS, Alliance

(Continued on Page 6)

New Rates Filed by AT&T Would Cut Interstate Bills

By Phil Hirsch

CW Washington Bureau

WASHINGTON, D.C. — AT&T filed new interstate rates last week that could become effective as early as Jan. 1 if they are approved by the Federal Communications Commission. The rate changes would lop about \$2 billion off what users are now paying for interstate Message Toll Service and Wats.

However, the changes also call for increasing private line rates by approximately \$400 million, so the net reduction in user bills would be about \$1.6 billion.

But since the new FCC-mandated surcharges for access to the long-distance network could add \$3.3 billion to users' communications costs next year, users could end up paying more rather than less than what they pay now. And if pending legislation is enacted, business users' bills would be even greater (see story on Page 9).

The \$400 million added to private line rates represents an average increase of 15.3%. This increase is part-

ly due to the private line access charge, which amounts to \$25/month per line termination. Without the access charge, the average increase in private line rates is 9.4%, said a spokesman for AT&T Communications (formerly the Long Lines Division).

The private line rate changes vary widely. At one extreme is an 85% increase in monthly and installation charges for telegraph-grade service. At the other extreme is a 38% decrease for 56K bit/sec Dataphone Digital Service.

Generally, the rate reductions have been loaded onto the high-bit-rate, longer distance offerings — where AT&T faces the greatest competition and/or expects to attract the most new business. For example, while monthly rates for 56K bit/sec DDS (without the surcharge or installation charges) will drop 39.4%, similar charges for 2,400 bit/sec DDS will increase 65.3%.

There is also wide variation within each of the service categories.

(Continued on Page 8)



CW Photo by L. Haber

Not Your Everyday Bargain

A cash-and-carry "yard sale" was held by Digital Equipment Corp.'s Computer Museum in Marlboro, Mass., one Sunday earlier this month. On sale at the indoor event — at prices as low as 25 cents and as high as \$300 — were items that included old disk drives, magnetic tape handlers and cash registers that were duplicates or overstock from the museum collection. The \$300

item was a 1967 vintage PDP-8 processor.

The museum made about \$1,000 from the sale, which was attended by some 125 people.

The museum will close in December in preparation for a move to downtown Boston's Museum Wharf, where it will reopen in the fall of 1984. The proceeds from the yard sale will be used to defray the cost of the move.



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Second-class postage paid at Framingham, Mass., and additional mailing offices. Computerworld (ISSN 0010-4841) is published weekly, except February (5 issues), April (5 issues), May (6 issues), June (5 issues), August (7 issues), September (5 issues), October (7 issues), November (6 issues), December (4 issues) and a single combined issue for the last week in December and the first week in January by CW Communications/Inc., Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

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\$1.50 a copy: U.S. — \$44 a year, Canada, Central & So. America — \$110 a year, Europe — \$165 a year, all other countries — \$245 a year (airmail service). Four weeks notice is required for change of address. Please allow six weeks for new subscription service to begin.



POSTMASTER: Send Form 3579 (Change of Address) to Computerworld, Circulation Dept., Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

I-8150 User to Get \$54,700

NCR Again Ordered to Pay User

By Bill Laberis
 CW Staff

GREENVILLE, S.C. — A court-appointed arbitrator has ordered NCR Corp. to pay \$54,700 in damages to a South Carolina user of its I-8150 minicomputer.

This marks the third time in recent months that NCR has been ordered to pay damages to users of its minicomputers as apparent sales misrepresentations from the late 1970s continue to haunt the business computer maker.

Meanwhile, in Boston, a consumer electronics chain filed a \$5.6 million suit against NCR, claiming the company fraudulently induced the chain into buying a turnkey business system that never worked as promised.

In the South Carolina case, an arbitrator awarded \$54,700 to WANS Anderson Radio, Inc. — essentially the amount that the radio station owner/user paid for an I-8150 minicomputer and associated programming and maintenance costs — plus unspecified legal fees. In granting the award, the arbitrator brushed aside NCR's contention that the user's problems resulted from the inability of a third-party software vendor to make the system work as represented by NCR.

Briefs filed by WANS' attorney, Theodore S. Stern of Greenville, S.C., contend that WANS had contracted with NCR in March of 1978 for the I-8150 system and that NCR had agreed to program the system for the user's specific needs, namely, to automate the radio station's commercial scheduling and billing.

cial scheduling and billing.

The briefs claim that NCR said it would provide a turnkey system and would handle the programming chores itself. "A complete staff of trained, experienced NCR programmers is available to ensure the successful installation of WANS' system," WANS claimed NCR wrote in its original proposal.

But after WANS signed the so-called Universal Agreement — a contract clause in most vendor-user contracts remanding damage complaints to arbitration — NCR said it would not perform the programming, WANS claimed. Rather, NCR recommended Contract Data Systems, Inc. (CDS) and backed up its recommendation in writing, assuring WANS that NCR had "been working with CDS for about six months and ... had very good success," WANS claimed.

CDS, however, had been incorporated for only three months at the time the letter was written and "had barely scratched the surface in NCR programming," WANS claimed. WANS backed up its claim of misrepresentation with an affidavit from another I-8150 user: Install, Inc. of Simpsonville, S.C. Install's treasurer, Margaret Spradlin, said that NCR also promised her company a turnkey system including software, but informed Install on the day the contract was signed that CDS would provide programming services. Spradlin said Install is considering a similar suit against NCR, claiming that only two of five programs promised by

NCR and CDS proved functional.

WANS, meanwhile, said it unplugged its I-8150 in May 1980 after CDS abandoned efforts to program the system a second time.

The award to WANS was the third arbitrator's ruling against NCR in recent months. In August, an arbitrator ordered NCR to pay an 8200 minicomputer user \$484,000 in damages relating to charges of breach of contract and misrepresentation [CW, Sept. 5]. In June, an arbitrator ordered NCR to pay \$216,000 to an I-9040 user [CW, Aug. 1], and a year ago, a U.S. Appeals Court ordered NCR to pay \$2.3 million to an 8200 user, The Glovatorium, which proved it had been defrauded by NCR in the sale of the business system.

The Boston Case

In the \$5.6 million suit filed last month in U.S. District Court in Boston, Underground Camera, Inc., a 16-store retail chain, claimed the 8200 system it contracted to buy in November of 1979 for \$163,000 has never performed as promised by NCR, despite the addition of a second 8200.

The five-count suit alleged that NCR understated the chain's DP needs while overstating the capabilities of its 8200 system. The suit further alleges that NCR has established a "sham company" in NCR Credit Corp. in order "to shield its parent, NCR, from liability."

Attorneys from neither party could be reached for comment before press time.

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President Of Fortune Forced To Resign

By David Myers
CW New York Bureau

NEW YORK — In a dramatic attempt to shed its reputation as a beleaguered small-computer maker, Fortune Systems Corp. last week replaced its "aggressive, very flamboyant" president and co-founder, Gary B. Friedman, and unveiled a series of multiuser computer systems aimed at a market niche above the IBM Personal Computer.

The announcement that Friedman was gone came unexpectedly at a press conference held to announce the new systems. Fortune Vice-President of Planning Homer Dunn — another founder of the California firm — revealed that Friedman, 49, had resigned under pressure from the company's board of directors. Friedman had been scheduled to make an appearance at the press conference.

David Caplan, a former vice-president at Perkin-Elmer Corp. who has been with Fortune only since July, was named acting president of the company.

Dunn cited "a disagreement over management style" as the reason for Friedman's sudden exit. Asked by reporters to define "style," Dunn replied, "Gary [Friedman] was a very aggressive, very flamboyant leader. That's what you need to get going. But when you become a company with many employees and a nationwide distribution network, other characteristics become more important."

Contacted by telephone last week, Friedman said, "If I didn't [resign], I probably would have been fired." Fortune's founder explained he felt control over the company was slowly being taken away from him by the firm's board of directors.

Friedman did, however, stress that his sudden vacancy is not an indication the firm is in any kind of financial difficulty. His departure "had nothing to do with the health of the company," he stated.

New Products Overshadowed

The announcement of Friedman's departure stole attention at the press conference from the product introductions, which included an entry-level computer, the Professional System, a more powerful multiuser processor called the Extended Performance processor — both of which were designed to be lower end members of Fortune's Model 32:16 family of processors — and a new operating system (see box). Company executives were at obvious pains to make it clear that Fortune Systems had taken a new direction to reverse two straight quarters of financial losses.

Fortune lost just over \$3 million on sales of a little over \$12 million in the second quarter ended July 1. The company has said it expects to report a third-quarter loss as well, but Dunn declined to say if Fortune anticipates a loss in its final quarter as well as for

Fortune Releases Two Systems

NEW YORK — The systems unwrapped here last week by Fortune Systems Corp. included:

- The entry-level Professional System, which offers up to 512K bytes of random-access memory and 16K bytes of read-only memory. Intended for small businesses, the Professional System is equipped with either a 10M- or 20M-byte hard disk backed up by an 800K-byte floppy. Single-user system costs begin at \$7,995.

- The multiuser Extended Performance (XP) system, which can support as many as 13 workstations and comes outfitted with either a 20M- or 30M-byte hard disk backed up by an 800K-byte floppy. The XP is configured with a standard 512K bytes of memory, expandable to a 1M-byte maximum. In its basic version with a 20M-byte hard disk, the XP costs \$12,995.

The Professional System series of processors is said to be completely hardware- and software-compatible with Fortune System's higher end Model 16:32 computer.

Fortune Systems also unveiled a Unix-like operating system dubbed For-Pro, which is derived from Bell Laboratories' Version 7 and System III Unix codes.

Fortune Systems is home-based at 300 Harbor Blvd., Belmont, Calif. 94002.

the year.

"The company has experienced some setbacks in the past," Dunn said. To recover from those setbacks, he announced that the company would no longer sell its equipment through "storefront retailers" and expects to increase both the volume of sales and the percentage of its business from large national accounts.

Dunn blamed the overwhelming market acceptance of IBM's Personal Computer for Fortune's lack of success with dealers. "Imagine trying to get their attention [once the IBM machine came out]. We had to change our focus to the more sophisticated retailers and value-added distributors," Dunn said.

In addition, the vice-president of planning said the company's housecleaning had been completed with the hiring of six new technical managers in the past half-year. This was done to "beef up" its technical management team and correct the errors in technical execution that had shown up in earlier versions of Fortune equipment, according to Dunn.

One of those new appointees was 56-year-old Caplan, formerly Fortune's senior vice-president of technical operations and now acting president of the company. Caplan had been the vice-president of Perkin-Elmer's Computer Systems Division until he was "recruited specifically to manage the company's technical operations," Dunn told reporters. "He wants to be chief engineer and doesn't want to be [permanent] president."

Fortune's board of directors has launched a search for a replacement for Friedman, Dunn said.

Distributed Processor Works With IBM, Compatible CPUs

By Ed Scannell
CW Staff

BOSTON — Claiming that it will free those Fortune 1,000 users enslaved by their IBM mainframes, Spartacus Computers, Inc. last week unwrapped an IBM 370-compatible distributed processor that can be networked with both IBM and plug-compatible mainframes.

Possessing approximately the same processing power as IBM's 4331 Model Group 2 mainframe, Spartacus' K102 reportedly allows users to download and run without modification programs compatible with IBM's 4300, 30 series and 3080 series mainframes in the VM environment.

The 32-bit Spartacus system communicates with IBM and compatible mainframes through a vendor-developed networking system called Knet, described by one company executive as "similar in scope" to IBM's Systems Network Architecture.

Knet is based on the Transmission Control Protocol and Internet Protocol (TCP/IP), a networking architecture introduced last year that is capable of carrying large amounts of data via value-added networks. It was developed to replace the Network Control Protocol, which functions with the U.S. Department of Defense's Arpanet network and is being considered as a possible standard for the military [CW, Feb. 15, 1982].

Allows More Flexibility

According to Spartacus, TCP/IP allows users more flexibility in configuring a range of communicating media including binary synchronous lines, channel-to-channel adapters and local-area networks including Xerox Corp.'s Ethernet, which reportedly allows the K102 to be connected to non-IBM devices offered by at least 30 different vendors.

Through Knet, the K102 can connect as many as 10 IBM Personal Computers to communicate asynchronously with IBM mainframes at a cost of \$10,000 per station, Spartacus said.

Spartacus' KOS/VM operating system, a streamlined version of IBM's VM/370 Release 6 operating system, features support for logical devices and full screen applications. The company said it streamlined VM/370 by taking out code that supported outdated IBM hardware devices such as IBM's 2305 drum plotter and 2311 disk drive.

KOS is made compatible with existing programs through 3270 simulation, which Spartacus effected by building two features into the system. The first function was added to the System/370 Diagnose instruction to permit a virtual machine running under KOS to act as a control unit for a logical 3270-type terminal. The second feature is a simulator subsystem that sets up a logical 3270-type device for each Ascii terminal logged on to KOS.

Whenever KOS is asked to direct data to one of the 3270 devices, it instead sends data to a memory location in the simulator virtual machine. The simulator then translates the 3270 operations into a form appropriate for the Ascii terminal.

A typical K102 configuration consists of 1M byte of internal memory (expandable to 2M bytes), 64K bytes of random-access memory, a 75M-byte Winchester disk drive, two I/O processors, serial communications adapters, power supply and the Universal System/IBM 370 instruction set. The Ethernet adapter and controller is optional.

Unlike the 4331 and other competing mainframes, the K102 plugs into a regular wall outlet, eliminating the need for raised computer floors. Because the system requires less power to run, the need for air conditioning is also eliminated. This permits users to place the system in the office instead of the computer room, according to George McQuilken, Spartacus president. McQuilken maintained that "the office of the future is not in the computer room."

McQuilken said the K102 system is particularly targeted at those Fortune 1,000 firms with large investments in IBM architecture, programs, data bases, training and staff. "Until now, these users had two choices that amounted to a dilemma: Either innovate and sacrifice compatibility, or stay compatible and forsake innovation," he said, touting the K102 as a viable alternative.

The K102 is priced between \$65,000 and \$95,000, depending on configuration, and is expected to be available Dec. 1. Spartacus is at 5 Oak Park Drive, Bedford, Mass. 01730.

Security Cited As DOD Splits Arpanet in Two

WASHINGTON, D.C. — In a move to combat illegal penetration of its computer systems, the U.S. Department of Defense (DOD) last week split its Arpanet computer network into two segments — one for military users and the other for access by civilians.

The two newly created networks will be known as Milnet, which will be used to interconnect classified computer sites, and R&Dnet, which will serve unclassified sites.

The split was necessary, according to DOD, because of the increasing sophistication of those who try to penetrate computer security. DOD said it also plans to require that individuals dialing into either network over public telephone lines present a password before being granted access to files.

The issue of computer security is "going to grow," said Deputy Under Secretary of Defense Donald Latham. "There will be more of these hackers, and we're going to have to deal with their increasing sophistication."

Formally known as the Advanced Research Projects Agency network, Arpanet was built in 1969 to interconnect computer sites working on DOD-related research and development, classified as well as unclassified. It was the world's first packet-switched network and ultimately interconnected 300 computers in the U.S. and Europe.

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SYBACK, our fast dump restore for VM systems, and SyncSort CMS, the only high-technology sort for VM/CMS, represent a great technological leap forward. No other programs of their type can provide all three of the following positive advantages:

(1) THE FASTEST VM PERFORMANCE: SYBACK and SyncSort CMS make data move like greased lightning. Compared to their "competitors," these programs can save a tremendous amount of computer resources:

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These savings are the result of our exclusive Fluid Buffering Technique (FBT). First developed in OS and DOS sorting, we've now extended the benefits of FBT to VM backups and sorts.

(2) THE BEST VM PRODUCTIVITY: SYBACK and SyncSort CMS have tremendous operational flexibility and user friendliness. They're rich in features designed to reduce human intervention in backup and sorting:

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• **SyncSort CMS**—Sorts CMS, SAM (OS or DOS), or VSAM files • Can be invoked from COBOL, PL/1 or BAL programs • Dynamically allocates disk space • Selects relevant records for sorting • Reformats records on output • Performs summaries of designated numeric fields • Produces reports with pagination, headings and dates • Can often produce simple reports in one day rather than, say, five. Much more, too.

(3) THE FINEST TECHNICAL SERVICE: Our Technical Service specialists are experts in their individual fields. You can count on fast, efficient, courteous service in both backup or sorting operations. More than 85% of all user requests for service are resolved within 24 hours.

CAVEAT EMPTOR: As with all performance software programs, the best way to find out what SYBACK and SyncSort CMS can do is to benchmark them yourself against your present programs.

That should help you make up your mind *fast!*

Wang Unwraps Image Processor for Office Use

(Continued from Page 1)

and Professional Computer systems, features of the Wang Office range in price from \$400 to \$95,000 depending on the machine and configuration selected. Most will be available in the second quarter of 1984.

The Information Distribution System (IDS) is a family of software products said to provide a pathway between Wang VS systems and an IBM or IBM-compatible host over an IBM 3270 Systems Network Architecture or Binary Synchronous Communications network.

"IDS creates a single integrated network for sharing and merging in-

formation between an IBM host and Wang VS systems," said Frederick A. Wang, executive vice-president and chief development officer for Wang. "It offers the best of both worlds to companies [that] have purchased equipment from IBM and Wang."

Two types of communications are possible with the IDS software: communications among VS systems through an IBM host and communications between VS systems and the mainframe host in the form of store-and-forward service. Prices for the IDS software, which will be available in March 1984, range from \$18,300 to \$58,000.

IDS fits in with Wang's newly announced communications strategy — Wang Systems Networking (WSN). WSN is not a product, but an umbrella term describing networking products that link Wang systems and provide gateways to other environments such as Ansi X.25. WSN products are

layered similarly to the International Standards Organization's Open Systems Interconnect reference model, a spokesman said.

More information on these announcements is available from Wang, One Industrial Ave., Lowell, Mass. 01851.

Wang Also Upgrades, Adds To Software Repertoire

BOSTON — In addition to its office automation and networking announcements, Wang Laboratories, Inc. also made several software announcements here last week, including an upgrade to Wang's word processing software, an application development tool and a relational data base.

The company also released documentation containing information on the firm's word processing document format, which can eventually be used to integrate office automation products under a single stan-

dard, a spokesman said.

The WP Plus is an integrated word processing editor that is an option for the Wang OIS, VS and Alliance office systems. Features of WP Plus include the integration of text and graphics, split-screen editing, multi-column editing, revision marks, an "Undo" feature to correct unwanted edits, footnotes, scientific typing, foreign language support, 250-char.-wide document support, an 8,000-page document capacity, spelling verification and an on-line training package.

Available in June 1984, WP Plus will cost \$2,000 for the initial license fee.

Also introduced was the Wang Professional Application Creation Environment (Pace), said to be a full-function, fourth-generation software system that encompasses all aspects of application development and includes data base, screen and report definition.

Pace combines into a single integrated environment the flexibility of a relational data base management system and data dictionary with form-driven, nonprocedural user interfaces, according to a spokesman for the vendor. The complete package will be available for \$34,000 in June.

The company also announced the availability of license agreements for its Word Processing Systems Communication Specification (WPS-CS) and the Wang Information Transfer Architecture (Wita). This announcement is intended to open the office automation marketplace to Wang's current word processing document standards.

The information will be provided in the form of manuals that contain the document data stream information. WPS-CS is available for a license fee of \$500; Wita, available in June, will also cost \$500.

More information on these products is available from Wang, located at One Industrial Ave., Lowell, Mass. 01851.

Wang Micro Gains Variety Of Options

BOSTON — Wang Laboratories, Inc. announced here last week that it has added a Wangnet option, Cobol Level II, wider chassis and Digital Equipment Corp. VT100 emulation to its Professional Computer.

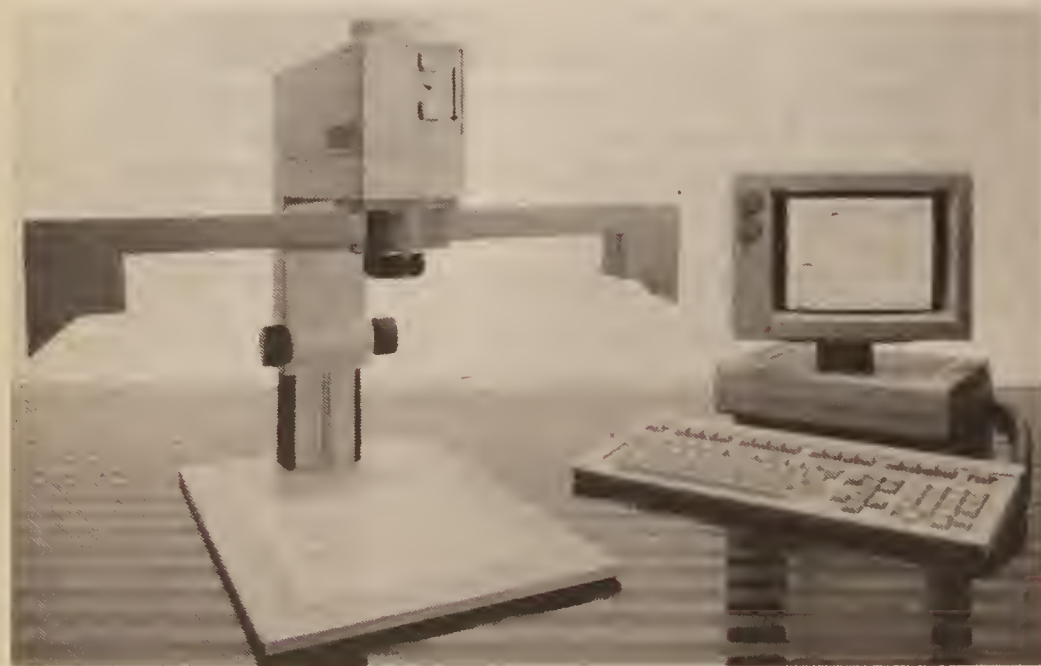
The Wangnet Professional Computer Service option is said to allow users to connect Wang Professional Computers directly to Wangnet, providing high-speed communications over broadband cable. Available in March 1984, the option is priced at \$800 with a \$10 monthly maintenance fee.

The Level II Cobol Programming Environment, developed by Micro Focus of Santa Clara, Calif., is a compiler and program development utility also available for the Professional Computer. Users can write Ansi '74 Level II programs for the Professional Computer with the utility. It is available for a license fee of \$1,500, and other features will increase the price.

The expanded chassis on the Professional Computer provides three additional expansion slots on the base system unit. With the eight-slot chassis, users can reportedly add greater capabilities to the Professional Computer, including the Professional Image Computer (see related story). Available in January, it will sell for a base price of \$2,945.

The VT100 emulation software allows the Wang Professional Computer to act as an asynchronous terminal in a DEC host environment using leased or dial-up lines and to perform remote interactive on-line processing. Available in January, the package will cost \$200.

More information on these announcements is available from Wang, One Industrial Ave., Lowell, Mass. 01851.



Wang Professional Image Computer

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Corrections

A chart accompanying "Micro Explosion Forces T/S Vendors to Refocus" [CW, Sept. 12] mistakenly identified the CSTS and CSTS II operating systems available on Computer Sciences Corp.'s CSTS service as products of Sperry Corp. The two operating systems are proprietary products of Computer Sciences Corp.

The Model 274C controller from Telex Corp. [CW, Sept. 26] supports 32 devices, not 320 devices.

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New Interstate Rates Could Go Into Effect Jan. 1

(Continued from Page 1)

Monthly charges for 9,600 bit/sec DDS, for example, will be reduced an average of 3.9%, but the charge for a Denver-to-Chicago DDS circuit will drop 14.2% (from \$1,898/mo to \$1,626/mo).

The following are sample rate comparisons for other services included in last week's tariff filing:

• MTS: A 69-mile, 5-minute daytime call from New York City to New Haven, Conn., now costs \$2.05; it would cost \$1.84 under the new tariff.

The same call between New York and Los Angeles, now \$2.70, would cost \$2.45.

• Wats: The proposed tariff reduces average rates 6.9% if the access surcharge is included and 10.7% if it is not. A San Francisco-area Wats customer whose calls total 80 hour/mo and are made during the business day to the East Coast now pays \$1,420.05/mo for service; under the proposed tariff, he would pay \$1,296.65.

A similar customer in Chicago, calling near Chicago, now pays \$251.15; under the new tariff, he would pay \$252.65.

• Voice-grade private line service: A New York City-to-Pittsburgh, Pa., circuit now costs \$528.06; the new rate would be \$653.20.

A similar 3,000-mile circuit, which now costs \$2,331.10, would be priced at \$2,003.00.

Balance of Rates

AT&T announced its proposed long-distance rates at a press conference here which was attended by several of the technicians who wrote the tariff. One of those technicians said that a business user now spending as little as \$15/mo per line for dial-up long-distance service could save enough in reduced MTS rates to balance the increase generated by the access surcharge.

On that note, AT&T Communica-

| Overall Rate Changes for Private Line Services* | | | |
|-------------------------------------------------|----------------------------------------------------|-------------------------------------------------------|-------------------|
| | Percent Change With Special Access Surcharge | Percent Change Without Special Access Surcharge | |
| | | Recurring and Installation Charges | Recurring Only |
| Voice Grade | 16.9 | 9.8 | 7.5 |
| DDC Total | (3.9) | (6.7) | (8.3) |
| DDC 2.4 | 74.3 | 66.4 | 65.3 |
| DDC 4.8 | 19.9 | 15.5 | 12.9 |
| DDC 9.6 | 0.5 | (2.4) | (3.9) |
| DDC 56 | (38.0) | (38.8) | (39.4) |
| TDC | 34.9 | 14.0 | 4.9 |
| Telegraph Grade | 85.0 | 76.0 | 76.0 |
| Wideband Data | (7.5) | (8.2) | (8.2) |
| Program Television | ** | 42.5 | 32.6 |
| CCSA | ** | 12.0 | 12.0 |
| SCAN | ** | 19.8 | 19.8 |
| EPSCS | ** | 10.0 | 10.0 |
| PL Category Overall | 15.3 | 9.4 | 7.3 |

* Without Demand Effects
** Special Access Surcharge Not Applicable
() Denotes Negative Amount

Source: AT&T

tions President Morris Tanenbaum, the featured speaker at the press conference, issued a warning to Congress that proposed legislation ef-

fecting a delay or elimination of access charges "would force us to revise our plans to cut long-distance rates and thus deny these rate reduc-

tions [to] our customers.

"Indeed," Tanenbaum said, "we [would] need to consider rate increases."

CDC Unwraps Two Processors to Boost Speed of Cyber 170 Supercomputers

MINNEAPOLIS — Control Data Corp. last week unwrapped two versions of a multiprocessor that, when linked to its Cyber 170 Series 800 supercomputers, is said to increase computational speeds up to 16G operation/sec in a 64-processor configuration.

The Cyberplus processor is an enhanced commercial version of the company's Advanced Flexible Processor parallel system that has been used exclusively for specialized government and military applications. The company said it plans to use Cyberplus in numerically intensive commercial and scientific applica-

tions such as manufacturing, medical research and the analysis of seismic data.

CDC attributes Cyberplus' processing speed to the use of its ring architecture permitting the interconnection of up to 16 processors, which forms a high-speed communications channel, the company contended.

A spokesman said the ring architecture allows each processor to read and write each ring at a sustained rate of 800M bit/sec. Therefore, the spokesman explained, a multiple-processor system is capable of an interprocessor transfer rate of 1.6G bit/sec multiplied by the number of processors. Up to four rings, or 64 processors, can be attached to one Cyber 800.

The internal architecture of the system permits multiple computational streams of data to be constructed and executed in parallel. For ex-

ample, the change algorithm for image processing running on Cyberplus is about 100 times faster than on CDC's 7600 system, the spokesman related.

The primary Cyberplus system in a multiprocessor configuration operates in 8-, 16-, and 32-bit integers, while a second system operates in 64-bit floating point. Each processor contains 256K 64-bit words of memory, which is expandable to 512K 64-bit words.

The basic version of Cyberplus, which includes a 16-bit integer unit and 256K words of memory, is priced at \$735,000. When purchased with all available options, the system costs \$1.6 million.

First deliveries of the system will begin in the third quarter of 1984 from Cyberplus Product Marketing, through P.O. Box 0, Minneapolis, Minn. 55440.

IBM User Group Slates Meeting Oct. 22-26 at Phoenix Hilton

CHICAGO — Common, the IBM user group, will hold its Fall 1983 Conference at the Phoenix Hilton from Oct. 22 to Oct. 26.

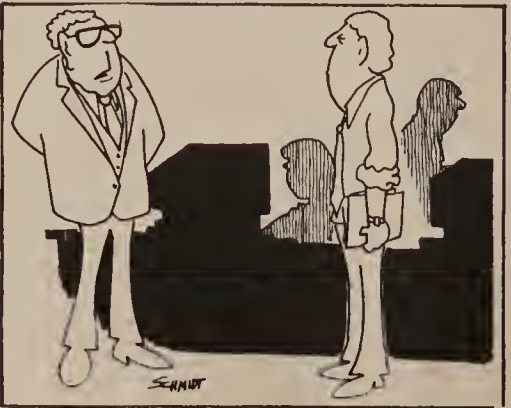
A highlight of the conference will be several presentations on the intro-

duction of the IBM Personal Computer into the corporate setting. IBM will provide information on the latest technical aspects of its product.

Among the speakers at the conference will be Lou Veltri of Software Plus, Inc.; Tom Longman from The Systems Center, a Texas firm; Steve Papermaster of MCM Systems of Texas; Don Chapin of CBIS Corp. in New York City; and Ron Berry of Peerless Engineering in California.

Preregistration fees are \$100 for members and \$160 for nonmembers. On-site registration fees are \$130 for members and \$180 for nonmembers.

Further information on the users group meeting is available from David G. Lister, Administrative Director, Suite 1717, 435 N. Michigan Ave., Chicago, Ill. 60611.



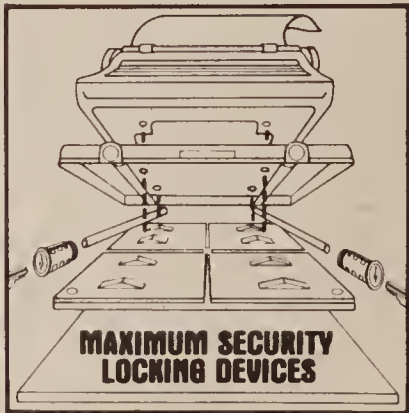
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But AT&T Issues Strong Warning

Congress Mulling Bills Barring Access Charge

By Phil Hirsch

CW Washington Bureau

WASHINGTON, D.C. — The charges that users may have to pay to access long-distance, dial-up and private line services beginning next January were submitted to the Federal Communications Commission (FCC) on Friday, Sept. 30. The following Monday, AT&T filed inter-Lata Access and Transport Area (Lata) tariffs covering long-distance, dial-up and private line usage charges.

Whether these rates will be implemented, however, is questionable. They all assume that beginning Jan. 1, residential users will pay a surcharge of \$2/mo per line and business users will pay up to \$6/mo.

Shortly before the tariffs were filed, the U.S. Senate Commerce Committee approved a bill barring imposition of the surcharge on residential users, as well as on business subscribers leasing single lines until Jan. 1, 1986. Similar legislation had been passed by the House of Representatives Telecommunications Subcommittee.

AT&T officials have warned that if this legislation is enacted, all of the recently filed rates are likely to be revised, resulting in a reduction of long-distance charges (making them lower than the ones filed) and an increase in the remaining access charges.

Two Payment Types

The access charge tariffs filed Sept. 30 cover two types of payments: the \$2/mo or \$6/mo surcharge end users would pay directly to their local carriers beginning Jan. 1, and the surcharge the local telephone companies would collect from each long-distance carrier with which they interconnect. Since the long-distance carriers would pass this second charge onto their customers, end users would actually pay both fees.

The two sets of charges are designed to reimburse local telephone companies for the costs they incur in providing access to inter-Lata transmission facilities — for example, the circuits provided by AT&T, MCI Communications Corp., Southern Pacific Communications Co. and other interstate carriers. The access facilities supplied by the local carriers include local loops, which connect subscribers to nearby switching centers, and other circuits running between each switching center and the interexchange carrier's network termination point — the so-called point of presence.

Today, long-distance access charges are reimbursed through payments collected by local telephone companies entirely from interexchange carriers (who include the payments in their charges to end users). The new scheme would replace the present one on Jan. 1.

Altogether, the nation's 1,540 telephone operating companies would collect about \$20 billion annually under the access charge tariffs filed late last month. Approximately \$2.1 billion would come from residential users and \$1.2 billion from business users; the rest would be paid by in-

terexchange carriers and passed onto their customers.

Since end users would pay some access charges directly, and the charges would be imposed on all customers of local telephone companies — including those who make no long-distance calls — less would have to be collected from long-distance charges, so AT&T has been able to propose lower rates for some offerings. Its competitors almost certainly will follow suit once the new AT&T tariff is implemented.

The usage charges proposed by AT&T last week would reduce its rates for dial-up, long-distance voice-grade service an average of 10.5%;

Wats rates would drop an average of 6.9% and the toll-free 800 service would increase an average of 1.3%. Private line rates would rise an average of 15%. (All of these percentages reflect the related access charges.)

But there is wide variation within most of the categories. For example, usage rates for 2,400 bit/sec Data-phone Digital Service (DDS) would increase 74%, while 56K bit/sec DDS would cost 38% less.

If the pending legislation is enacted, there will be no surcharge on residential users and possibly none on single-line business customers for at least two years. Bell and independent local telephone companies, as a

result, would lose most of the \$3.3 billion to be collected directly from end users.

To make up for this loss, the local carriers would have to charge their other customers — multiline business users and interexchange carriers — higher access fees for Message Toll Service/Wats. The carriers would then pass on these increases to the users of interexchange services.

In addition to inter-Lata network access, business users also will have to pay for access to the intra-Lata network, which encompasses much of today's intrastate transmission facilities. The latter charges have not been firmly established yet.

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Federal Express Planning Fax-Based Delivery

(Continued from Page 1)

digital signals and processes it right there."

The types of documents delivered through Gemini (whose name is likely to change when the service hits the marketplace) will include "any form of graphics that people want urgently sent," such as engineering drawings, advertising layouts and legal documents.

Federal Express officials are unwilling to disclose details of the Gemini project to the press until its formal announcement several months from now, but in interviews with people close to the project, including several Federal Express employees, *Computerworld* has confirmed the following facts:

- Federal's investment in Gemini is an estimated \$100 million, with an

additional \$10 million expected to go toward a heavy advertising campaign on a par with the award-winning ads for overnight delivery.

- The transmission machines will be built by NEC America, Inc. and custom-tailored to Federal's needs. In late 1982, Federal purchased 1,000 machines, and last month the company signed a second contract, which is expected to put the total number of machines in excess of 2,000. The machines will reside at Federal Express dispatch centers throughout the country and at customer sites where there is a high volume of use.

- The transmissions, which will travel via telephone lines and satellite, can reproduce between 15 and 30 page/min at speeds as high as 56K bit/sec or as low as 2,400 bit/sec.

As with its existing service, high-volume Gemini customers will be offered attractive discounts. In fact, such customers will have the option of leasing a machine from Federal Express for several hundred dollars, with a small charge for each transmission, thus bypassing the pickup side of the equation.

If a customer is transmitting to someone else leasing a fax machine from Federal, then pickup and delivery is eliminated completely.

Given the limitations of facsimile transmission posed by incompatibility among machines and poor resolution, business facsimile is generally regarded as nothing particularly impressive. But according to David

Guthrie, a stock market analyst at Morgan Keegan and Co., Inc. in Memphis, Tenn., facsimile à la Gemini should solve these problems with a combination of logistical and technical wizardry.

Neither NEC nor Federal will comment freely on the technical details of the project but, according to Guthrie, who has been tuned in to Gemini since its inception, the quality of reproduction with the new service is very high with resolution at 400 line/in.

Unlike most documents that emerge from a fax machine on chemically treated paper, the Federal Express product will be on regular white paper, looking like a high-quality photocopy, Guthrie said.

Detailed pricing for the service is not yet established, and Federal Express restricts its comments on this score to an assurance that Gemini pricing will be "competitive" with such services as the \$25 four-hour delivery announced by MCI Communications Corp. last month.

But both Federal Express employees and market analysts have confirmed that while the price of transmitting a 10- to 12-page document could range from \$10 for overnight delivery to \$100 for two-hour international delivery (along with the company's regular overnight service, Gemini will extend to Western Europe by mid-1984), the average price for a two-hour delivery of 10 to 12 pages is expected to be about \$40.

Will Market for Gemini Develop? That's Key Issue, Analysts Say

Whether Federal Express Corp.'s electronic document transmission service will be as successful as its overnight delivery is a matter of educated guesses among market analysts and industry consultants.

The key question appears to be whether Federal will be able to create a solid market for Gemini.

"Federal Express created a new market out of nothing with its overnight delivery," commented Walter Ulrich, president of Walter E. Ulrich Consulting, Inc. in Houston. "The company is going to put its promotional budget behind this. And remember its history of excellent ads."

As Ulrich sees it, "the only really interesting question is whether people will use it."

Federal Express is "certainly taking some risk in that there's substan-

tial capital investment involved," commented David Guthrie, vice-president of research for Morgan Keegan and Co. in Memphis, Tenn. "I think usage of the service will accelerate as the public becomes more aware that it's available.

"We like the skepticism, though," Guthrie added. "It creates opportunity."

While some assert that facsimile transmission is a dull technology and Federal Express will sooner or later find itself with 2,000 obsolete fax machines, others believe Federal is demonstrating tremendous foresight with its investment in facsimile.

As one source close to Gemini put it, "With fax technology getting so good, it's only a matter of time before others figure out that facsimile is really where the market is."

Honeywell and IBM Users Troubled By The High Cost of Terminals? The Intelligent Multi-Device Interface Unit Could Be The Answer.

HERE'S HOW IT WORKS

The TEC MZ-80 IMIU is a microprocessor based communications computer designed to connect a variety of ASCII CRTs to a host system over a high-speed line. In a rackmount or attractive desktop-size unit, the IMIU combines all of the following features:

- Sync/async line speed compensation
- Protocol conversion/emulation
- Terminal and line concentration
- Terminal controller and device emulation
- Local processing

IMIUs ARE MEETING THE NEEDS OF MANY KINDS OF USERS

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This customer uses 20 IMIUs to expand the number of student and administrative terminals that can be connected to their mainframe. They have IMIUs at the central campus and 14 remote campuses.

An Aerospace Manufacturer:

With almost 80 IMIUs installed, this customer uses IBM-3270 emulation and VIP-7700 pass-through, as well as bar code scanners and connection to an intelligent switch.

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Forty installed IMIUs, providing VIP-7700 pass-through and emulation, support data collection terminals, point of sale devices, and a unique energy management system for a large shopping center.

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ment after consultation with our Customer Support Department, which will verify the configuration requested. Contact Thomas Engineering for full details.

HONEYWELL HOST SYSTEM ENVIRONMENT

The MZ-80 IMIU offers flexibility and power to users of all types of Honeywell computer systems that use VIP protocol. The MZ-80 provides a VIP-7700 compatible interface for up to 32 serial RS-232 devices such as CRTs, printers, Teletypes, etc. All devices share one synchronous line to the host, yet each device may have a different "personality" provided by driver programs in the IMIU.

IMIU software can also provide complete emulation of the VIP-7700 and compatible terminals such as the ITT-Courier 700 (including its functional extensions). This capability provides the Honeywell user with the features of the VIP-7700, using ASCII terminals costing substantially less. In this mode, up to 16 terminals are supported.

IBM HOST SYSTEM ENVIRONMENT

The MZ-80 IMIU also offers cost and configuration advantages to users of IBM binary synchronous (BI-sync) protocol. In this environment, the IMIU appears to be an IBM-3271 cluster controller using any of a large selection of less expensive ASCII terminals to emulate actual IBM-3270 terminals. IBM-328x compatible printers are also supported. In emulation mode, up to 28 devices are supported. IBM SNA/SDLC capability will be available in late 1983.

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Use Remains Voluntary

Nine-Digit Zips Finally Under Way

By Jake Kirchner

CW Washington Bureau

WASHINGTON, D.C. — After seven years of planning, programming, debate and delay, the U.S. Postal Service (USPS) has finally implemented its nine-digit Zip Code program.

On Oct. 1, the USPS began sorting mail by the longer numbers at approximately 55 of its largest mail processing centers that have the automated equipment needed to handle the nine-digit Zip Codes. USPS said approximately 1% of first class mail already carries the longer numbers. In 1982, post offices handled some 62.2 billion first class cards and letters.

Although the initial volume is small, USPS expects to handle about 12 billion pieces of first class mail with the new codes in the first year of its "Zip + 4" program.

USPS is counting on a rate discount recommended late last month by the independent Postal Rate Commission and adopted by the USPS board of governors last week to stimulate use of the new Zip Codes. The discount equals one-half cent per piece for presorted letters delivered to the post office in groups of at least 500, and nine-tenths of one cent for each piece in nonpresorted lots of 250 or more letters.

There are approximately 35 million of the new codes, which are

based largely on existing five-digit numbers and expand the Zip Code system to allow USPS to sort mail to the individual mail carrier-route, not just the individual post office, and target it down to the sides of separate street blocks and individual buildings on the routes. By using new optical character readers (OCR) and bar code readers, the Postal Service believes the new numbers will significantly increase postal automation and economies.

Aimed at Business

As with the five-digit Zip Codes, use of the longer numbers remains strictly voluntary and is aimed at volume business mailers. To ensure that remains the case, legislation pending in Congress would prohibit USPS from making the codes mandatory or encouraging general use of the new codes through advertising.

Postmaster General William Bolger has said he supports "legislation to allay any fears" about the program, according to a USPS spokesman, who noted that nonbusiness first class mail "is a very slim percentage" of the total mail volume.

But for congressional intervention, the Zip + 4 program would have been implemented 2½ years ago. In mid-1981, Congress passed a bill delaying the program until this month because of concern the longer numbers would be made mandatory

or advertised so heavily that individuals might feel they should convert to their use.

Also, House and Senate postal service committees feared the post office was rushing into the new program without having sufficiently tested the new machinery required to sort the new codes and without reliable cost-effectiveness figures to demonstrate adequately that the USPS would indeed save money through the program.

At the end of September, Congress' General Accounting Office (GAO) completed a study of the program and reported there are still "some uncertainties" about the performance of the new equipment. The OCR machines will read the Zip Codes and print a bar code on each envelope, which will be read by new bar code readers and sent on to the appropriate mail carrier for delivery.

But the Postal Service assured the GAO that the problems are common to start-up operations and are being corrected; USPS said it firmly believes "the equipment will perform up to expectations." Despite its concerns, the GAO concluded: "None of the uncertainties or needed improvements identified by GAO warrants a delay in the start of the program."

The primary concern for mailers is whether or not the rate discount is sufficient to recoup the costs of converting to the longer numbers. The Postal Service makes available computer tapes that can be matched against a firm's mailing lists to convert to the nine-digit zips. Additional costs of programming files for the longer numbers through purchased or in-house software make conversion attractive only to large mailers, the Postal Service acknowledged.

The Postal Service originally recommended only the half cent per 500 presorted letters discount and said that would make conversion economically sensible for mailers with only four mailings per year to each address on its list. This figure was based on a projected conversion cost of 2 cents per address and one year to recover conversion costs.

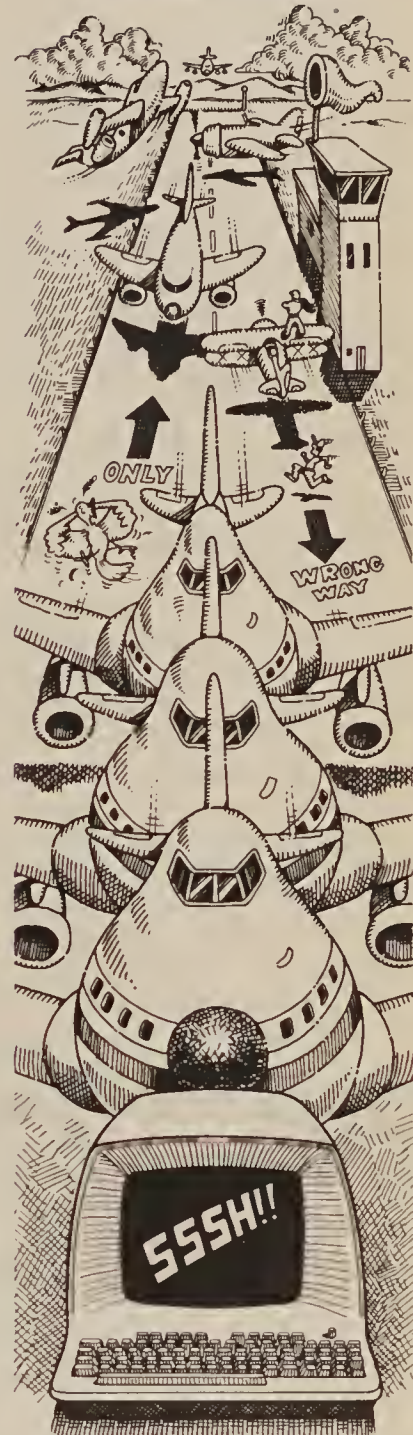
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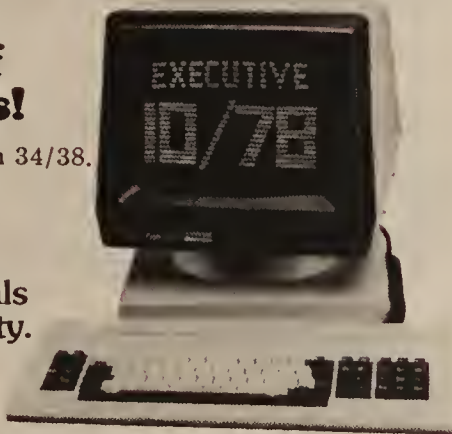
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Psychologists Offer DP Consulting

Erasing the High Anxiety From Computing

By Lynn Haber
CW Staff

LA JOLLA, Calif. — If a friend or business associate tactfully suggested therapy to cure your company's data processing performance ills, what would you say?

"You can have the most expensive, high-quality computer equipment installed by experts and have it work perfectly — but, if your staff is too frightened to use it, it doesn't do you much good," said Dr. W. Mark Lassleben, psychologist and partner of Transition Associates (TA), a high-technology management consulting firm here.

The Webster dictionary defines phobia as an exaggerated, usually inexplicable and illogical fear of a particular object or class of objects. What occurs when a phobia arises within the environment of modern computer technology?

"The way computer phobia interferes in the work place is that people avoid situations where they can be successful. People miscommunicate, which causes all sorts of problems up and down the organizational structure. We feel that this is an area that's been neglected in the high-technology field," Lassleben said.

"There are a lot of people who have awfully high expectations of computers. They've got this million dollars worth of equipment, but it's not working the way they hoped it

would have, not because there's anything wrong with the machine, but because these people are afraid to use it or because they don't know how to communicate with each other any better than before they had the machines. The human factor has over and over again put limitations, in a variety of ways, on very sophisticated equipment," he added.

Dr. Lassleben and Dr. Thomas F. McDonald of TA have been consulting with people in high-technology industries for the past three years. Both have backgrounds in psychological training.

Their firm works with people who are automating their offices and using new technology as a part of their work situations.

"All the work we do at TA is related to high technology, computers or other information processing types of systems and, particularly, the human element involved — how people work with these machines, how people work with each other as a result of working with these machines," Lassleben said.

"We work with a variety of people-oriented type managers who are having to interface their old or new work force as a whole with a new generation of machines. Actually, the principles of the machinery aren't very much more complicated, but people are so awed and overwhelmed by even the word comput-

er, they think 'I can't handle that,' and they have this fearful reaction, just like somebody who's been burned by a book of matches and is faced with striking a match again," Lassleben said.

At Iowa State University, a graduate student and full-time data processing trainer recently completed his master's degree thesis in which he attempts to construct a measure for computer anxiety.

"I have an interest in computer anxiety because I work in training people in data processing. I was aware that certain people showed a lot of apprehension when confronting computers," Matthew M. Maurer said.

"What my test can be used for, in conjunction with observation, is to identify people who are having these problems, including those people already in the industry. I think computer anxiety affects a person's general feeling of well-being about his job satisfaction," he said.

Because there is very little literature that addresses technophobia anxieties, the staff at TA relies on self-reporting and other measures of anxiety.

"There are a lot of common measures of anxiety that are readily adaptable to the computer environ-

ment. It's a fairly old concept," Lassleben said.

"There are a number of solutions, largely individual in nature. You try to figure out where the anxiety is coming from and why. You do that on an individual basis, sometimes on a person-by-person basis, and sometimes you find that there's a familiar theme within a certain business. And the basic strategy in overcoming any anxiety is to introduce the person into the situation that causes the anxiety in a slow, methodical manner, step by step," Lassleben said. "There are some special tricks and twists that come up in high technology, but gradually you do the same kind of thing you do with any other sort of phobia."

According to Lassleben, the greatest obstacle in getting executives to admit that they're having business-related problems that go beyond technology is that most executives don't view people problems as important or remediable.

"We've learned a great deal from the Japanese recently. People are starting to think more seriously, executives especially, about the human factor in the work place, and that satisfied employees do make a difference in the products that are turned out at the end of the line," he said.

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Endorsed by DPMA

Second DP Fraud Bill Reaches House

By Jake Kirchner

CW Washington Bureau

WASHINGTON, D.C. — The Data Processing Management Association (DPMA) has given qualified endorsement of legislation that, while primarily directed at curbing credit card fraud, would also make computer fraud a federal crime.

The Counterfeit Access Device and Computer Fraud Act would set penalties of up to \$10,000 in fines, 10 years in prison or both for anyone who uses or conspires to use "a computer with intent to execute a scheme to defraud." The bill, H.R. 3570, would also authorize the U.S. Secret Service to investigate computer and credit card fraud.

At a Sept. 29 hearing on the bill before the House Judiciary Subcommittee on Crime, DPMA International Vice-President Robert A. Hoadley pointed to the association's support for the better known Federal Computer Systems Protection Act, H.R. 1092, sponsored by Rep. Bill Nelson (D-Fla.) and now under consideration in the House and, in a companion bill, in the Senate.

"We believe H.R. 3570, as a means of attacking the burgeoning crime of credit card fraud, is a valuable tool in the hands of federal prosecutors," Hoadley said. He added that "to the extent that the language in H.R. 3570 relating to computer crime will not conflict with the more comprehen-

sive prohibitions contained in H.R. 1092, we would have no hesitancy in supporting it."

Hoadley said DPMA "will leave it to the parliamentary experts in the Congress to determine whether, if both bills become law, they will complement or inhibit each other."

August Bequai, attorney and computer crime expert, also testified in favor of the bill. Bequai said it makes sense to group credit card and computer fraud together. "The very survival of the cashless society depends

on the security of its computers.

"Legislation in the area of [electronic funds transfer systems] should, by necessity, address two issues: counterfeit access devices and threats to the computers that run the system," according to Bequai.

He also said that professional criminals have entered the credit card fraud market. "The real concern, however, is that these same criminals may increasingly turn their attention to the computers that make the cashless society a reality."

Universities Must Be Wary Of Vendors Bearing Gifts

By Katherine Hafner
CW Staff

Not ordinarily one to look a gift horse in the mouth, Doug Van Houweling, vice-provost for computing and planning at Carnegie-Mellon University in Pittsburgh, Pa., has turned down a vendor donation or two. "If a grant appears that it wouldn't fit into our overall system, we can't really accept it," Van Houweling explained.

Accepting a vendor grant or donation may appear easy on the surface, but Carnegie-Mellon and other recipients of large donations must go through a comprehensive planning

process before receiving vendor-donated equipment.

"The hardware for a computer system is usually the smallest part of the cost of running it over a five-year period," commented Leonard Bosack, director of Stanford University's computer facilities. "Maintenance and people are the real costs. So we're rather reluctant to take on only hardware, as it requires a substantial commitment from the university."

Both Stanford and Carnegie-Mellon like to be given six months to a year in preparation time before the actual arrival of donated equipment. At MIT, "some things we'll accept without any notice, and others we try to stage over a significant period of time," said James Bruce, the school's director of information processing. MIT's \$70 million partnership with Digital Equipment Corp. and IBM will take five years to implement.

Raising the necessary funds from industry, government and alumni to meet the training and support demanded by large donations is "a crusade of monumental importance," commented Andries Van Dam, chairman of computer science at Brown University, which recently received a \$15 million donation from IBM and 50 Apple Computer, Inc. Lisa microcomputers. Brown plans to provide workstations with communications capabilities to each student, staff and faculty member by 1990.

"We think the Brown experiment is sufficiently novel and compelling that we'll be able to raise a significant amount of money," Van Dam added. "In that sense, the \$15 million from IBM is a bellwether."

In addition to the tremendous sums of money that must be raised to support vendor-donated equipment, there are such issues as providing security to mainframe-based information and the machines themselves.

"Security is something we'll be grappling with," commented Van Dam. "We have all kinds of sensitive information on our mainframe."

"No one is going to walk off with a DEC [VAX] 750," MIT's Bruce said in response to a question on physical security. "But an IBM Personal Computer is very easy to walk off with." MIT will "probably bolt the [Personal Computer] box down to the desk and use electronic circuitry to detect when it's been unplugged."

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Both Promise, Problems Seen for Future Systems

By Tom Henkel
CW Staff

Tomorrow's computer systems could reportedly offer from 200 to 1,000 times the performance of current systems. But while many experts contend such systems may be as few as 10 years away, others predict that peripherals with new technology to support those systems may not be ready by then.

Even currently available systems, such as supercomputers produced by Cray Research, Inc. and Control Data Corp., challenge current disk drive capabilities, noted Dr. Alan Gottlieb, associate professor of computer science at the Courant Institute of New York University (NYU). And larger commercially oriented processors

may also require bigger, faster disk drives to support the increased I/O activity brought on by large data bases and multiprocessing environments.

Users of scientific and commercial processors have traditionally had different needs when it comes to processor technology. The same is true for disk technologies. Users of large-scale scientific processors typically must have the ability to read large blocks of generally sequential data into a system. For those users, increasing the speed at which data can be transferred from the disk to the system can be beneficial, according to James N. Porter, publisher of the "Disk/Trend Report," an annual marketing publication on the disk

drive industry.

Commercial users, on the other hand, tend to access data in a random fashion. For them, getting the information from the disk to the system faster is not as important as speeding up the seek time or the process of looking for data stored on disks, according to Porter.

Currently, users of large-scale scientific processors appear to be hardest hit by the lack of improved disk drive technology. Porter said supercomputer users have had some success in improving transfer rates by using parallel-track disk drives or units that can read and write several disk tracks over one channel at one time.

But Dr. James F. Decker, special as-

sistant to the director of the Office of Energy Research with the U.S. Department of Energy, noted that as systems become larger, severe bottlenecks may develop if new disk drives or disk drive alternatives are not developed.

Since there are only about 100 domestic users of supercomputers, Decker said there has not been a strong incentive for peripheral vendors to spend research and development funds to produce innovative ways of storing data. Since commercial users are not quite as desperate for new disk technologies, big system vendors like IBM are not in a hurry to make dramatic improvements in disk storage, Porter added.

For the foreseeable future, Porter maintained, disk drives for both commercial and scientific systems will be based on the same fundamental technology, namely media-coated disks, which rotate at high speeds under read/write heads. The short-term enhancements to disk technology, such as parallel-track drive technology and perpendicular recording, may improve both seek time and transfer rates, but will use the same basic disk technology, Porter said.

Optical Disks Show Promise

Optical disks, which use a laser to write and retrieve information, show promise for large system data storage, but initial optical disk products have offered frame or picture-oriented storage, as opposed to data storage, noted James Gasbarro, a member of the research staff at Xerox Corp. in Palo Alto, Calif.

The rapidly falling cost of system memory may provide users with the best hedge against bottlenecks caused by disk drives.

By bringing more data into main memory with one read/write operation, users can reduce the number of times their systems have to request information from a disk drive, explained Peter Nelson, supervisor of the computing center at Bell Laboratories.

Scientific users have the problem of getting data from a disk drive to main memory quickly enough to meet the processor's demands. NYU's Gottlieb noted one promising way of writing more disk-stored data into main memory is to amplify all the tracks of a given disk cylinder with one read/write operation. This could transfer massive amounts of data into main memory. Gottlieb noted that declining main memory costs may make it more economical to move massive amounts of data into a system and allow the applications software to use only what is necessary.

But Gottlieb also said electrical interference can be a problem in moving data from many disk tracks at one time.

Commercial users can also make greater use of main memory for improving data transfer. However, Nelson pointed out that bringing more data into main memory requires modification of many commercial applications programs. The programs, he said, have to be altered to look for needed data in main memory, rather than request the information from a disk drive.

Dear David;



Computer Advice
Columnist: David
Jamison Carlyle

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Alleged Cracking of Depositor Code Sparks Denials From Swiss Banks

By John Gallant
CW Staff

NEW YORK — Allegations that French customs officials used powerful military computers to snare French citizens who may secretly hold illegal Swiss bank accounts have sparked denials from an official here of one of Switzerland's largest banks.

The dispute revolves around an article published in a satirical French weekly, *Le Canard Enchaîné*, claiming that customs authorities, with the aid of military cryptographers, used computers to crack several coded lists reputedly containing the names of 5,000 French citizens holding accounts valued at F175 million, or about \$21 million, in the Union des Banques Suisse (UBS).

The report further claims that French officials are searching out those account holders and have already extracted admissions from a number of residents in exchange for a promise of lenient treatment.

If reports concerning the cracked code lists prove correct, it may spell trouble for Swiss banks in general which have an almost legendary reputation for impenetrability and can not afford to admit to vulnerability to foreign tax authorities.

But, according to a senior bank officer here, that report is false. "The fact is that this is utter nonsense,"

said H.R. Kuchler, senior vice-president of UBS's New York branch. "The article is totally false. The periodical that this report appeared in is less than reputable. It is not my idea of objective media."

However, French authorities are claiming to have pierced the mists of secrecy surrounding the identities of UBS depositors. A spokeswoman for the French consulate here confirmed that reports had appeared in both the *Le Monde* newspaper and in dispatches from Agence France Presse containing statements about the affair made by Henri Emmanuelli, the French Secretary of State to the Minister of the Economy, Finance and Budget.

Illegal Deposits

According to the spokeswoman, Emmanuelli was quoted recently as saying that customs officials had identified an unspecified number of French citizens who had illegally deposited capital in the UBS in Switzerland. He indicated that lists seized by customs officers had been decoded, and through them officials had already identified at least F175 million in illegally deposited capital. Emmanuelli made those statements during a press conference in Bordeaux, France.

The press reports stated that while Emmanuelli would neither confirm

nor deny the information in the *Le Canard Enchaîné* article, he did confirm that an unnamed number of the account holders identified thus far had already admitted to the offense. The spokeswoman said the consulate had received no official government statement on the matter, and she could not confirm how the lists had been obtained or whether military cryptographers using computers had aided customs authorities in breaking the code.

However, a *New York Times* report quotes Emmanuelli as saying the lists were decoded by "computer experts who know their jobs."

But, UBS's Kuchler claimed the code-breaking scheme is a smoke screen. "If they claim to have cracked the code, I would have to say that is a lie. There is simply no code to break. Our account numbers are not coded. They are simply a means of identifying our account holders. There are no such lists singling out residents of one particular country. There are no lists which contain account numbers and names together. If they are actually making these statements, it is almost criminal."

Further, Kuchler said, "We assume that the French customs authorities, who we feel have used some very questionable methods in looking after their residents, must have collected their own information in other ways and have made up this story. The French must have compiled these so-called lists piecemeal through questionable tactics. You cannot crack lists that don't exist. If this is not a fabrication, I don't know what it is."

A spokesman for the Swiss consulate here would not confirm details of the story, but he added that in speaking with UBS officials he was told that the report was no more than a bluff.

CAM-I Meet Set for Nov. 8

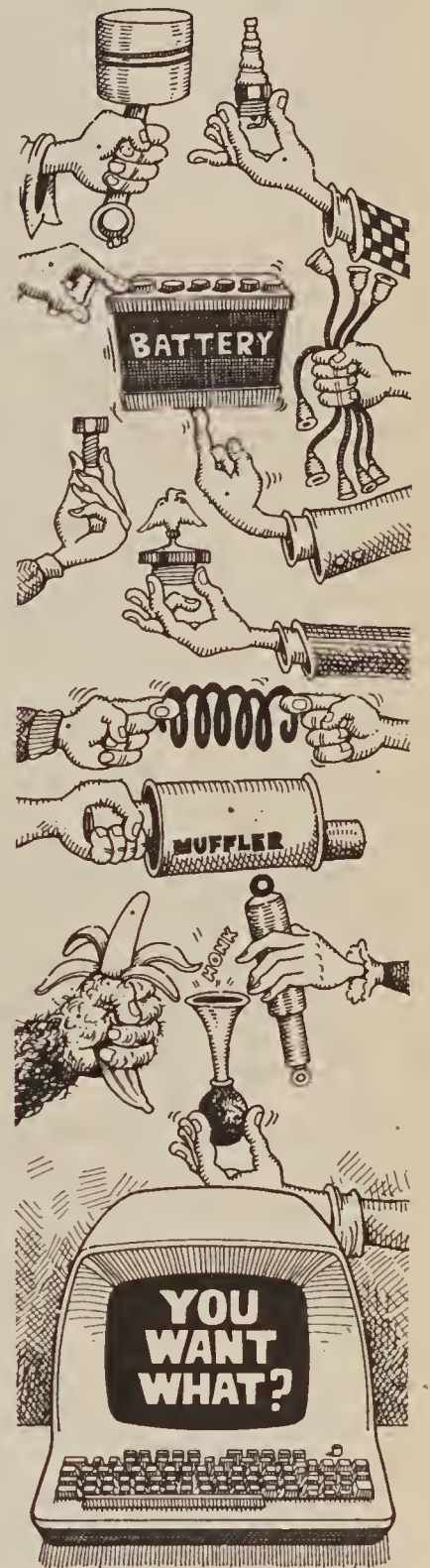
ARLINGTON, Texas — Computer Aided Manufacturing-International Inc. (CAM-I) has announced that its 12th annual meeting will be held in the Westin Galleria Nov. 8-10 in Dallas. The theme of the meeting will be "From Concepts to Reality — Through CAM-I."

The meeting reportedly will show how major achievements can be realized through joint developments of new manufacturing systems. The opening speaker for the session will be Charles F. Rule, who is special assistant to the U.S. assistant attorney general.

Rule will reportedly convey his department's thoughts on how joint research and development can speed development and subsequent industrial explosion, a conference spokesman said.

The fee for admission is \$350 for members; \$450 for nonmembers. Additional information is available from CAM-I, located at Suite 1107, 611 Ryan Plaza Drive, Arlington, Texas 76011.

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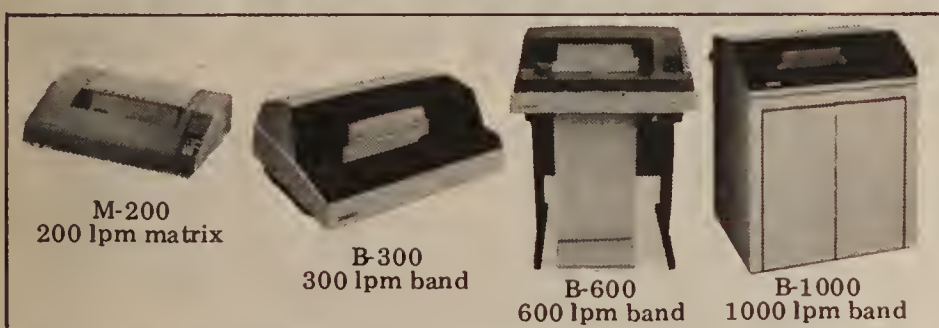
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International Report

FROM THE CW INTERNATIONAL NEWS NETWORK

JAPAN

TOKYO — Hitachi Ltd. has reportedly developed a high-speed element based on Josephson junction technology that boasts a switching time of 5.6 picoseconds. However, the materials used in the junction area at this stage in development consume too much electrical power to make the technology commercially feasible at present, the company said.

TOKYO — Three of Japan's major computer vendors introduced three personal computers here last week, all aimed at the large corporate consumer market. Matsushita Electric Co. unveiled the CF-2000, which will be available in late October for \$235. Hitachi Ltd. unwrapped its H-1 portable system, which will be available at the end of November for \$270. Sony Corp. announced the HB-55, priced at \$235 and also slated for delivery at the end of November.

SWEDEN

STOCKHOLM — Bostel is the name of Swedesoft's recently introduced Cobol-based business language compiler, which is intended for corporate users on a variety of systems. Bostel, which stands for Business-Oriented Structure Emphasizing Language, runs on mainframes, minicomputers and micros, according to the vendor, allowing

for distributed processing within an organization. Pricing on Bostel begins at \$700 for Digital Research, Inc.'s CP/M and Microsoft, Inc.'s MS-DOS operating system environments. Swedesoft is based at Wellington 33, S-111 24 Stockholm, Sweden.

WEST GERMANY

PADERBORN — Nixdorf Computer AG's Workstation 8810, unveiled during the Hanover Fair here, has gone into mass production. The 8810 is a personal computer that can be used as a stand-alone machine or in conjunction with larger Nixdorf systems, the vendor said.

MUNICH — Techno Venture Management Co. is a new venture capital group that has been founded here by Siemens AG, the Matuscha Group, TA Associates of Boston and Advent Management of London. The company is reportedly seeking start-ups, holding companies and companies specializing in communications technology, data processing, automation, electronics and medical and biological technologies.

CHINA

BEIJING — An IBM Personal Computer-compatible microcomputer has been jointly introduced here by Beijing Wire Communications and the Ministry of the Electronics

Industry. The product, called Great Wall 100, is said to be completely compatible with IBM Personal Computer software and to support Chinese character processing. The micro comes with an Intel Corp. 8088 microprocessor, 256K bytes of random-access memory, 40K bytes of read-only memory, two 320K-byte, 5¼-in. floppy disk drives, a high-resolution green phosphor CRT and a parallel printer adapter. The memory is reportedly expandable to 1M byte, and a math processor can be incorporated to process 8-, 16-, 32- and 64-bit integrals, a spokesman said. Applications packages now available for this machine reportedly include a data base management system, word processing, statistics, financial, editing and graphics.

BEIJING — The Beijing Institute for Software Research and Training was officially established here Oct. 4. The goal of the institute is to promote computer applications and to train software personnel, a spokesman said. The institute is being co-funded by the United Nations Funding System for Science and Technology Development and the Chinese government.

FRANCE

PARIS — During a recent meeting with French electronic industry and ministry officials, President Francois

Mitterand outlined France's objective to become the third leading world power in the production of electronics, trailing the U.S. and Japan. Mitterand stated that France will have invested \$18 million in this area during the 1983-87 period, derived from industry and state sources. The president of France is also pushing high technology into the public school system and backing educational television promoting the use of microcomputers.

PARIS — TRT, the French subsidiary of Philips Information Systems, Inc., has unveiled a fifth-generation, manufacturer-independent Systems Network Architecture-compatible communications network here. The product, called Sopho-Net, is said to handle all protocol conversions to interconnect any existing computers, word processors and terminals on the market and to integrate both public and local networks. Its non-hierarchical structure is said to guarantee security from failure. Philips, with the help of AT&T, has taken its first major step into the telecommunications market with Sopho-Net, a spokesman said. The next step will be a local-area network product called Sopho-Lan, a token ring passing local-area network that will handle voice, data and images through frequency multiplexing.

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Speech Mixed With Optimism, Realism Hawke Keynotes Australia DP Meet

By Susan Coleman
Australasian CW

MELBOURNE, Australia — An opening ceremony, which included laser beam light displays accompanied by computer-synthesized music and a host of other computer-driven audiovisuals, kicked off the 10th Annual Australian Computer Conference held here last week. But the real star of the show, according to attendees, was Australian Prime Minister Robert Hawke, who keynoted the event with a speech mixed with optimism and realism.

While Hawke's participation in the conference was read earlier as a formal government endorsement to the computer industry here, he was not overly hopeful about the federal government allotting more funds to support the development of an Australian computer industry. Instead, he dwelled mainly on the need to educate school children in the use of computers. Furthermore, he emphasized the honing of human skills needed for Australia "to retain its place in world standard of living rankings," rather than on any specific strategy for competing in world markets with locally produced hardware and software.

"Training the work force to maximize the benefits of more sophisticated capital processes is of fundamental importance. ... Heavy investment in education and train-

International News

ing is an investment in our future," Hawke declared.

Hawke went on to reiterate the moves the federal government had made in recent months to spawn growth in the national computer industry, including the 100% tax incentive for venture capital investments in high-technology areas [CW, Oct. 3].

Hawke maintained that a lack of venture capital, as well as a shortage of managerial expertise among those in high-technology enterprises, has traditionally prevented Australia from developing in this area. The tax

scheme begins to address these problems, he said.

Furthermore, Hawke expressed concern that the Australian computer industry achieve its maximum contribution to the economy, but at the same time claimed that it was self-defeating for the government to commit itself to maintaining the commercial use of "key technologies."

"It is in neither the community's nor the industry's interest to move down a track which locks the government into continuing rounds of assistance aimed at ensuring the continued utilization of technologies where adjustment to changing technologies should be encouraged," he said.

Coleman is the editor of Australasian Computerworld.

NBS Says DES to Continue In Force Through End of 1986

WASHINGTON, D.C. — The National Bureau of Standards (NBS) last month said the federal Data Encryption Standard (DES) will continue in force at least through the end of 1986. NBS also said it is considering adopting a Pascal standard for federal use.

The DES, when first adopted as a

federal information processing standard (Fips) in early 1977, called for a five-year review. Having solicited and reviewed comments on the standard during the last year, NBS said the standard has been affirmed for continued use and will be reviewed again beginning on or before Jan. 15, 1987.

At the same time, the bureau said it is considering adopting as a federal standard the American National Standard Institute (Ansi) standard for the Pascal programming language. The standard was developed jointly by Ansi and the Institute of Electrical and Electronics Engineers. It would be added to the existing federal standards, which include Minimal Basic, Fortran and Cobol.

NBS has requested comments on adopting Pascal as a federal standard. Comments on Pascal should be submitted before Dec. 12 to Director, Institute for Computer Sciences and Technology, Attention: Proposed Fips for Pascal, Room A200, Administration Building, NBS, Washington, D.C. 20234.

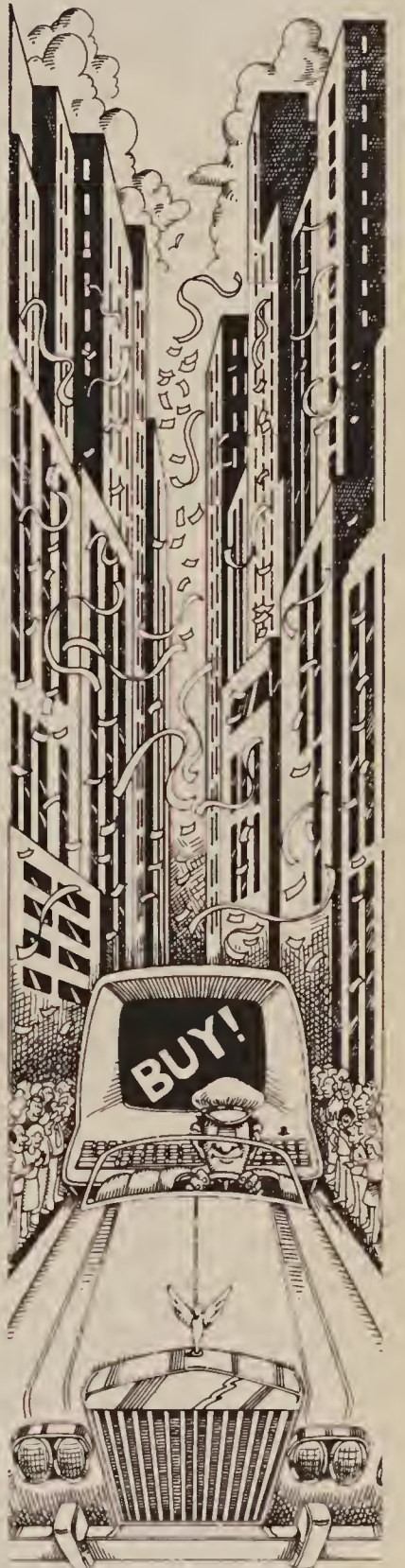
Users Meet Set For Oct. 14-16 On UCSD Pascal

SAN DIEGO — The UCSD Pascal User's Society (Usus) will hold its semiannual national meeting at the Hyatt Regency Crystal City in Arlington, Va., Oct. 14-16.

Tom DeMarco, computer scientist, lecturer and author, will be the keynote speaker for Usus. His talk is titled "Data Flow Computing." The meeting will also feature two free tutorials, "The P-System — How to Use It Better" and "Introduction to UCSD Pascal," as well as technical presentations and demonstrations.

Registration at the door is \$35. More information is available from Information Systems, Inc., Suite 200, 1901 N. Ft. Meyer Drive, Rosslyn, Va. 22209.

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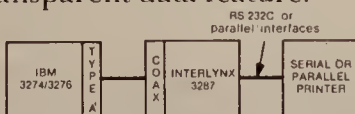
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Small Schools Retraining Educators

Colleges Scramble to Beat DP Teaching Shortage

By Peter Bartolik
CW Staff

While large colleges scramble to sign up as teachers the few computer scientists awarded Ph.D. degrees each year, some small colleges are turning to programs that retrain educators from other fields.

There are too few computer science educators with Ph.D.s [CW, Sept. 19] to fill the needs of large prestigious colleges. That limits the number of students that may be enrolled in such programs and could be a contributing factor to a projected shortage of computer scientists and electrical engineers [CW, July 11].

What is bad for large institutions, however, is much worse for smaller colleges, according to educators interviewed by *Computerworld*.

There are some 2,000 four-year colleges with enrollments under 5,000 that are edged out of the Ph.D. marketplace by bigger, more prestigious schools, according to Dr. William Mitchell, chairman of the computing science department at the University of Evansville, Ind., and 1983 editor of *Interface, The Computer Education Quarterly*.

Estimates indicate that over the past six or seven years only about 200 to 250 doctoral degrees have been

awarded each year to computer scientists, and less than 100 of those scientists accept academic appointments.

There are several thousand openings for computer science teachers among some 3,000 departments of mathematical science, according to Dr. Ed Dubinski, who recently started a retraining program in computer science at Clarkson College of Technology in Potsdam, N.Y.

Over the next two years, some 200 non-computer science educators from small colleges will have been retrained to teach undergraduate computer science courses. "Small colleges can't compete for the traditionally trained computer science educator," Mitchell said. This past summer, Evansville awarded 14 masters of science degrees in computer education to the first class of a two-summer, intensive retraining program for educators from other disciplines [CW, May 3, 1982].

Also started this past summer was an Evansville-modeled degree program at the University of Memphis (Tenn.). According to Dr. Stanley Franklin, the program was initially designed to meet the needs of junior and four-year colleges in Tennessee's public higher education system, but was expanded when few in that

system met the prerequisites, and publicity in a newsletter prompted applications from other states.

The Clarkson program is based on the experiences of a similar program at Cambridge University in England, Dubinski said, and is designed for educators "at small, quality liberal arts colleges where they will be essentially the only people teaching computer science."

The program was initially designed for 30 people, but an experimental program was added with applicants who were considered over-

qualified for the original curriculum; next summer, 120 educators will be participating in the two-year program.

Providing the inspiration to at least the Evansville and Memphis programs was a then unique experiment that began during the summer of 1979 at the University of South Carolina.

The program was geared toward small South Carolina colleges after a state report indicated a widening gap between the need for computer specialists and the ability to train them, according to Dr. Carter Bays, director of the

program. "The smaller schools could not even find a computer scientist," he said.

Bays set up a program wherein a master of science degree could be earned during three intensive summer periods. From 40 applicants, 25 educators were selected; 17 completed the program, and another two joined in mid-course. A second phase began in the summer of 1982 with 14 students, and two more joined this summer.

Statistics on the South Carolina program are currently being evaluated and will soon be published.

Retraining in Computer Science Requires Highly Motivated Teacher

College-level educators seeking retraining in the computer science field must be highly motivated in order to undergo the intensive training provided by the four programs recently examined by *Computerworld* (see related story).

During the three summers in the University of South Carolina's program, participants can expect to work 18 to 22 hours a day for nine weeks straight, according to Dr. Carter Bays, director of the program. "Within those

nine weeks we give a big dose of the first three courses in our graduate sequence, which is normally spread out over 15 weeks," he said.

At Clarkson College of Technology, Potsdam, N.Y., Dr. Ed Dubinski said students can expect to work 10 to 12 hours a day, seven days a week for eight weeks. All the programs require applicants to have completed a full-level programming course. Even after sampling the world of computing, students in the University of

Evansville (Ind.) program are warned by Dr. William Mitchell, "You need still to measure the psychological and emotional price which you are about to pay."

Mitchell and Dr. Stanley Franklin of the University of Memphis (Tenn.) caution that their programs are not equivalent to "traditional" masters-level programs in computer science, but rather are compressed programs designed to fulfill the need for undergraduate teachers at small colleges.

Graduates of his program, Mitchell said, "would have dubious security in a large university; as soon as someone more qualified came along, they would be eased out." On the other hand, he noted, small colleges are more likely to expand a department to make way for a newly acquired computer education asset.

Students in the first group of Clarkson's program had their tuition, room and boarding expenses — \$7,200 for two summers — funded by a grant from the Alfred P. Sloan Foundation, and Dubinski hopes for future funding. But expenses can range from approximately \$1,500 a summer at South Carolina to almost \$4,000 for tuition alone at Evansville.

In addition to the time commitment during the summer, all the programs require work during the regular school year. Evansville and Clarkson require students to teach a class and complete a project.

South Carolina will not begin a new course until the summer of 1985, but the other three schools intend to offer new programs next year. Memphis will enroll about 20 students and Evansville about 25.

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Conferees Exhorted to Embrace Quality in Software Development

By Robert Batt

CW West Coast Bureau
SOUTH LAKE TAHOE, Calif. — The quality ethic is largely missing when it comes to software development in the U.S., according to Joseph Podolsky, information systems manager at Hewlett-Packard Co.

Addressing an Education Consortium Executive Con-

ference here, sponsored by software consultants Kapur & Associates, Inc., Podolsky said quality is very often treated as a secondary issue to meeting target dates.

"Somehow as an industry we seem satisfied with 'nice tries' instead of insisting on doing it right from the beginning in all parts of the project with a determination

to do even better next time," he told the audience of data processing executives.

Even where quality guidelines exist, Podolsky continued, DP managers fail to insist on compliance and have given programmers permission not to care as much about quality because of the stress on meeting target dates.

The HP manager outlined some current quality procedures and mechanisms and noted their deficiencies. Testing, for example, is not a disciplined activity, he asserted. Rather, it is carried out in a haphazard way, often under deadline pressure and usually by the programmer who wrote the code, thereby building in an inevitable bias to gloss over defects.

"Testing usually results in 'fixes' rather than rewriting the program. These fixes often cause patches, which make the system prone to future failure and subsequently more difficult to modify," Podolsky added.

Testing, he claimed, rarely addresses the noncoding aspects of system development. In addition, documentation is often not updated to reflect fixes, and knowledge gained during testing is seldom made available to all who might profit from it. The same criticisms, he said, can be made against quality-control procedures such as inspections, walk-throughs, application generators and formal mathematical proofs.

Podolsky enumerated a number of steps needed to achieve consistent quality in software development:

- A commitment to quality should be the overriding objective.

- In the design process, software developers should define the attributes desired for the system as well as the functional specifications and then select the best practices for achieving each attribute.

- Once established, these standards should be used throughout the development process with inspections to determine conformity to the standards via code, walk-throughs and inspections.

- As knowledge increases, the technical standards should be evaluated and enhanced, and feedback should be sought whenever possible.

"In achieving a far higher level of quality in software development, what will be required is an attitude of compliance with, and caring for, standards, rather than the current defensive posture and attempts to hide errors," Podolsky concluded.



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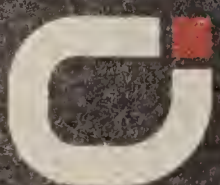


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Importance of Data Security Campaign Stressed

By Robert Batt

CW West Coast Bureau

SOUTH LAKE TAHOE, Calif. —

There is good reason for data processing managers to be worried about threats to the continuity and integrity of information, a security specialist has warned.

Doug De Vries, computer security manager at Hewlett-Packard Co., said protection, detection and recovery procedures are vital components if an effective data security campaign is to be mounted within an organization.

Speaking here at the recent Education Consortium Executive Conference, sponsored by software consultant Kapur & Associates, Inc., De Vries said taking measures to protect information assets should be viewed as part of prudent management procedures.

"Computer security is a growing problem because of the increasing business dependence on DP. Vital corporate assets are involved as distributed systems using micros and networks become more complex. The question facing us as an industry is whether . . . we are prepared to take reasonable steps to protect ourselves from real threats," he said.

The impact of a breach of data security can be serious, De Vries told an audience primarily composed of DP managers. It can result in customer dissatisfaction, cash flow problems, a backlog of data and physical products and a resulting work load imbalance.

IEEE Video Meet Slated to Discuss Bell Labs R&D

PISCATAWAY, N.J. — A video conference sponsored by the Institute of Electrical and Electronics Engineers (IEEE) on Bell Laboratories' communications research and development will be televised via satellite on Dec. 6.

The conference will feature one-way video and two-way audio, with Michael Lesk of Bell Labs opening the program with a discussion of software algorithms. Evelyn Hu, also of Bell Labs, will address fabrication processing of microelectronics, and Paul Shumate of Bell Labs will speak on photonics.

Registration is \$130 for IEEE members and \$180 for nonmembers, with more information available from IEEE, 445 Hoes Lane, Piscataway, N.J. 08854.

"Because of this, DP managers need to plan for deliberate security breaches and natural disasters. They must consciously choose protection based on the level of risk, rather than close their eyes and hope disaster will not strike," he said.

Evaluation Needed

In determining the appropriate level of security, he asserted, managers should evaluate the role of computer systems in their companies; the asset value of DP resources; the impact of downtime, including the number of people affected; and the business effect on the organization.

De Vries outlined a number of steps that managers should take in developing a data security plan.

- First, assign a manager whose sole focus in the corporation is to monitor and ensure security.

- Second, clarify who is responsible for what in the area of security, and make it broadly known throughout the organization.

- Third, issue written policies, institute DP audits and evaluate their effectiveness. Without this step, De Vries cautioned, data security will probably not happen.

- Fourth, have the management information systems director receive regular reports from the data security manager.

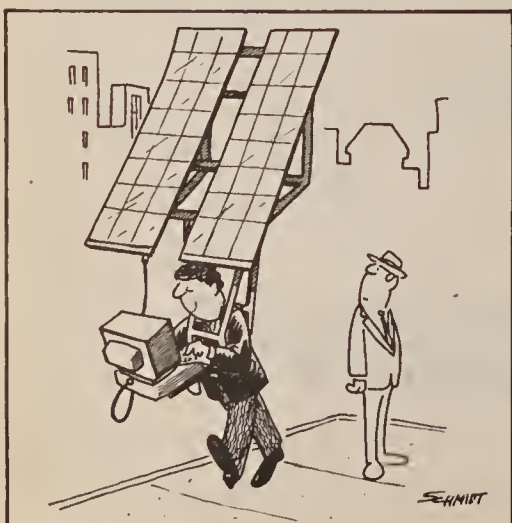
The need, De Vries said, is to analyze, decide on and implement data security controls for the company as a whole and for specific data centers

and programming groups.

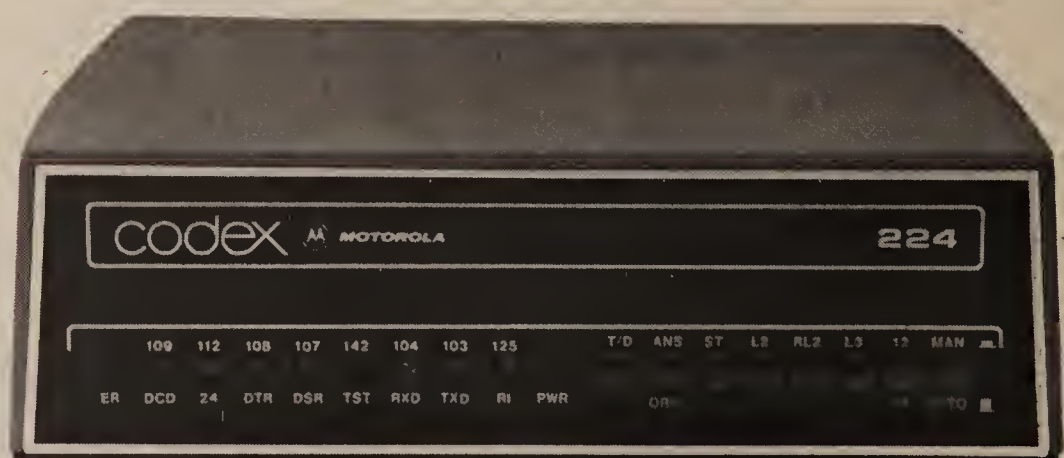
"You should develop a data security team which includes key players from different parts of the organization. This way you will have a much better chance of getting a policy for data security that is actually implemented," he told the conference attendees.

It is important, he added, to rate the probability of information being vulnerable and to protect it to the appropriate degree. In doing this, he suggested, it is useful to identify the attributes of a would-be saboteur or thief, which usually include a knowledge of how to write programming code, access to sensitive equipment, specific knowledge of a site and a motivation to succeed.

SAVE MONEY ON TALK FASTER.



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Where Do Business Analysts Fit?

Q Recently, a new DP manager was brought in from the outside. The first thing he did was reorganize the department. My organization, the systems group, remained intact, but he hired two users as business analysts. They were assigned the responsibility for needs analysis and feasibility studies, and they report directly to him. These activities were formerly my responsibility.

Neither of the business analysts has a DP background, and both are continually asking my people for help. I am trying to accommodate the reorganization, but frankly, now we're spending more time on these tasks than before, when we did it all ourselves.

A I'm not aware of any business analysts groups with such limited responsibilities. This type of organization works well as an integrated function where business analysts complement the function of systems analysts from needs analysis through the design process. Why limit the involvement of the business analysts to a few activities when their expertise can be helpful in all phases of systems development?

Give the present organization three months to succeed. If it becomes apparent that the organization has failed in its present format, suggest a more integrated and extensive involvement for the business analysts.

Q I have been assigned the unenviable task of documenting many programs that have never before been documented and have been repeatedly patched and modified. The systems in question have no user manuals, and the original authors are no longer working here.

How would you suggest that I approach this difficult task?

A I'm not convinced that you should be documenting these particular programs at all. Documenting old programs can be enormously time-consuming, not to mention frustrating. I would suggest that you at least address the possibility of starting from scratch; it

Turnaround Time By Larry E. Long

may be less expensive in the long run. Programs that were developed and are subsequently maintained without documentation are usually poorly designed to begin with.

If you feel that you must proceed, you and your boss need to ask yourselves a question: "What is the expected life of the systems involved?" As a rule of thumb, document undocumented systems if the system is expected to remain operational for at least two more years. If you anticipate replacing these systems within two years, make the best of what you have.

If the decision is to document, don't be as rigorous as you would for a new program. Extract critical documentation items from your existing methodology.

Q In addition to my responsibilities as DP education coordinator, I've been assigned responsibility for end-user education. My first attempt at end-user education was a failure. We announced and scheduled an eight-hour APL course to be presented on two consecutive mornings. There were nine confirmed reservations, and two students showed up. Several called in and said they would try to make the second session.

I canceled the course and have not rescheduled it or any other end-user program. Several users have asked me to try it again. Any advice on how to encourage end-user participation in these programs?

A By canceling the APL course, you made a tactical error. You turned away two people who had adjusted their schedules for an opportunity to learn APL. The best way to encourage future participation is to:

- Do a good job in presenting the material.
- Get some satisfied customers in the user community.

Complete the next course if only one person attends. Consider it an investment in user relations.

Before you decide on the future end-user offerings, get end users involved in the decision making. Invite their feedback on program alternatives. People are more willing to participate if they feel a part of the activity.

Let me turn this issue over to the readers. What other approaches have you used to encourage end-user participation in education programs?

Long, president of Long and Associates, is a consultant, lecturer and author in the field of information services. If you have a question you'd like him to address, send it to Larry Long, Editorial Department, Computerworld, P.O. Box 880, Framingham, Mass. 01701.

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Information Systems Group

Parole List Error Outrages Officials, Public

By John Gallant
CW Staff

ATLANTA — When Billy Isaacs' name appeared incorrectly among the names of 7,000 prisoners eligible for early parole from the state prison system, the error stirred dark memories of one of the most vicious crimes in Georgia history.

The mistake also made officials of the state Board of Pardons and Paroles wish

they had been more careful in designing the computer program that generated the list.

According to Silas Moore, spokesman for the board, the Department of Offender Rehabilitation's Sperry Corp. 1182 mainframe was programmed simply to print out a list of all inmates who had yet to serve one-third of their sentences, the amount of time a convict must serve

to be considered for the standard parole program. The board accesses the criminal justice data base, which includes inmates' records, through interactive terminals linked to the mainframe.

Thus, Isaacs' name appeared on the list of prisoners to be considered for release under the state's early parole program. Convicted in 1973, according to Moore,

Isaacs had served less than one-third of his sentence at the maximum security facility Georgia State Prison at Reidsville.

In July, the board sent the list to judges and district attorneys, as required by law, to solicit their comments before reviewing each case. When some of the criminal justice officials saw Isaacs' name among the candidates, they were outraged that the

25-year-old felon was to be considered for early parole. They raised a fuss that the local press was quick to parlay into headlines.

Isaacs was given a 40-year sentence for armed robbery and burglary in exchange for testimony that sent his brother, Carl Isaacs, his half-brother, Wayne Carl Coleman, and George Elder Dungee to death row in connection with the 1973 slayings of six members of the Ned Alday family.

The victims were systematically executed at their home in Donalsonville, Ga., according to Moore. With Billy Isaacs' testimony, Moore said, the three men were the first to be sentenced to death under Georgia's 1973 capital punishment law.

In addition, according to Moore, Isaacs was sentenced to two consecutive 30-year prison terms in Maryland for second-degree murder and kidnapping.

Ironically, the inclusion of Isaacs' name among the candidates to be considered for early parole was a mistake because he was already eligible for review within the regular parole program, a fact that incensed officials.

Georgia law stipulates that any inmate serving seven or more years, regardless of the length of sentence, is eligible for regular parole — a nuance that the Board of Pardons and Paroles programmer failed to incorporate in the list-generating program. Isaacs had already been denied parole twice, in 1980 and 1981, and was scheduled to appear before the board again in 1984, according to Moore.

'Simply a Human Error'

"You have to understand, his name is very well-known around here," Moore said. "That was quite unfortunate. The lists lent themselves to misunderstanding. Officials seized on Isaacs' name and released it to the media. That raised quite a fuss. It was simply a human error. The person who wrote the program simply dealt with those inmates who had served less than one-third of their sentences."

The error caused such an uproar that Moore said the board won't publish another list. "This was definitely a one-time thing. People were very unreceptive. It was so misunderstood that we don't plan to put out another," he said. One Georgia district attorney has filed suit to force the board to continue publishing the information. Moore said the question will have to be decided in light of the new state constitution that went into effect July 1.

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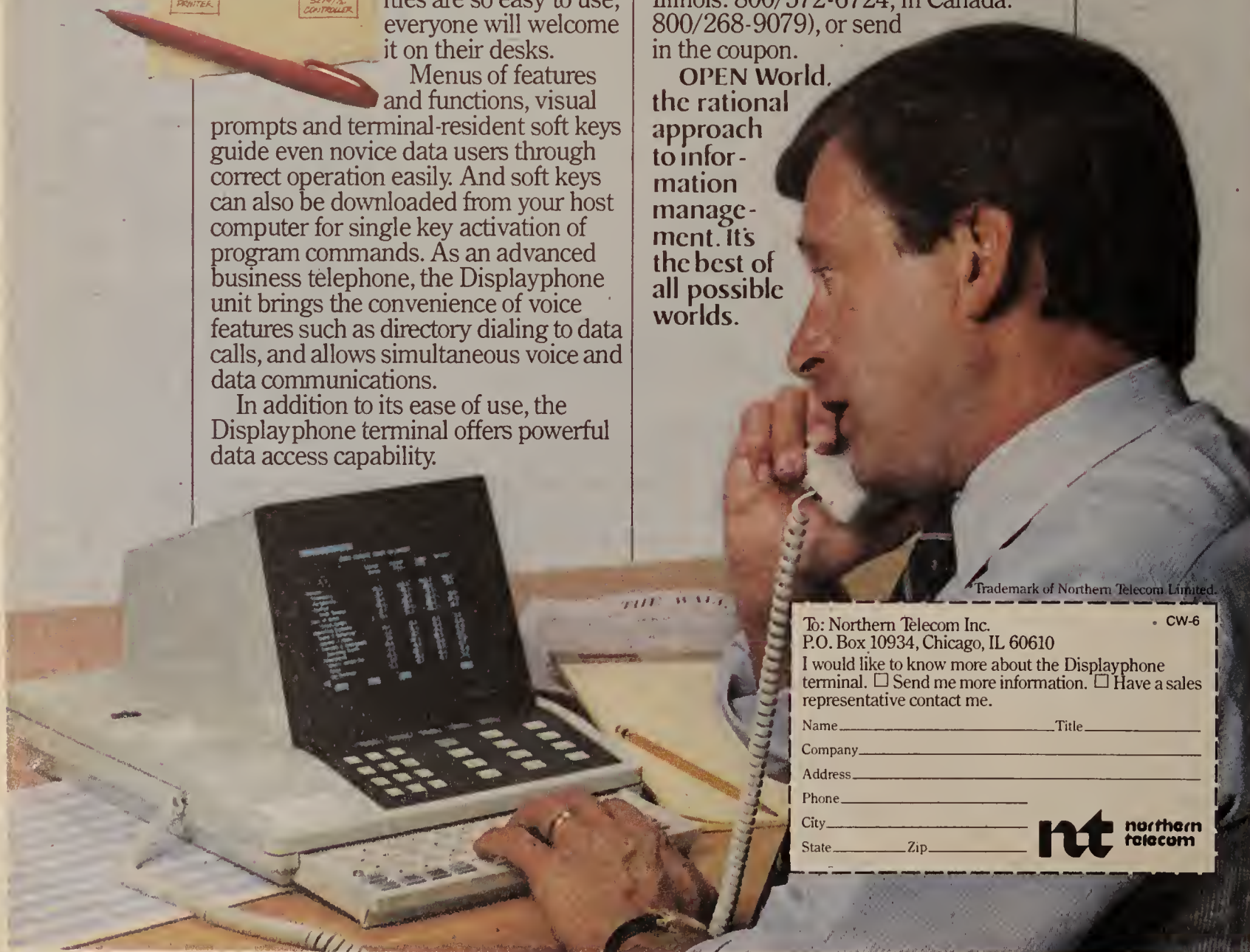
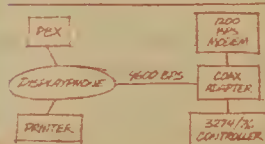
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| Terminal Type Will replace DEC VT 100, VT 101, VT 102 & VT 131 | Communication Interface RS232C/current loop X on, X off protocol (operator selectable) Full duplex compatible with WE modem #103A, 212A Baud rate - selectable 75, 110, 134.5, 150, 300, 600, 1200, 1800, 2000, 2400, 4800, 9600, 19,200 Parity - selectable odd, even, 1 or 0 Word length 7 or 8 bits |
| Ergonomic Characteristics Tilt, Swivel Detached low-profile (DIN) keyboard High contrast green phosphor Non-reflective surfaces Non-volatile set-up | Auxiliary Interface RS232C compatible Bi-directional Remote control - on line without display, auto print, line print, page print Baud rate - selectable 75, 110, 134.5, 150, 300, 600, 1200, 1800, 2000, 2400, 4800, 9600, 19,200 |
| Display High resolution 14" CRT standard 24 x 80 or 132 column/format Viewing area - (14 inch monitor) 9.09" (23.0 cm) wide by 6.8" (16.3 cm) high Character size - 80 column - .086" (2.24mm) high by .204" (5.18mm) wide 126 unique symbols - 94 alpha-numeric, 32 graphics symbols 7 x 10 matrix with 2 lower case descenders in 9 x 12 window Selectable 132 column x 24 line display mode with 6 x 9 character dot matrix Attributes - high/low intensity, blink, reverse video and underline at any display position Programmable, double width character line or double width/height character line Smooth scroll Line drawing graphics Cursor, selectable as box or blinking underline | System Oriented Features ANSI Standard X3.64 Multimode - local, interactive, edit page, line and partial page Self diagnostics Terminal status inquiry Numeric pad alternates as function pad Tabbing by column and by fields Horizontal "split screen" Data compression/separation X on/X off protocol Smooth scroll National character sets (option) Full editing command set with protected modes |
| Monitor Performance Green phosphor - 14 inch (35.6 cm) diagonal $\pm 1\%$ geometry Dot frequency, 22MHz 19.5 KHz horizontal frequency 50/60 Hz non-interlaced refresh | Physical Characteristics Mechanical Height - 15 inches (38.1 cm) Width - 18 1/2 inches (47.3 cm) Console depth - 15 1/2 in. (40.3 cm) Keyboard depth - 8 1/2 in. (21.6 cm) Weight - 35 lbs. (15.9 kg) Electrical Power consumption - 48 watts Power input selectable - 115 $\pm 10\%$ and 230 $\pm 10\%$ (50 - 60 Hz $\pm 1\%$) |
| Keyboard Low profile to European standard 33 Key detached keyboard including sculptured typewriter style 14 key numeric pad including period, comma, minus and enter Typamatic Four function keys Audible keyclick (operator selectable) Seven visual indicators Editing function - Tab, insert line, delete line, insert character, delete character, clear, home and back tab Upper/lower case with all caps light Local print | Environmental Temperature - 10° C to 40° C Humidity - up to 90% relative non-condensing Shock - 50g in 3 axis (in container) Vibration - 10 to 30 Hz (in container) Specification subject to change without prior notice. |

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At White House Conference

Reagan Calls for High Tech to Up Productivity

By Jake Kirchner

CW Washington Bureau

WASHINGTON, D.C. — President Reagan recently joined business executives and other high-ranking government officials in calling for use of new technologies, particularly computers and communications, to increase productivity in the U.S.

Speaking at the recent White House Conference on Productivity here, Reagan said that although the rate of productivity improvement has slowed in this country, there are still areas of the economy with increasing productivity.

"We think of those first computers, which could cost up to a million dollars and were so big they filled a room — a big room.

"Today a computer chip that performs the same functions can fit in the palm of your hand and costs under \$10. That's productivity," he said.

The conference, held at the State Department, culminated months of preparation, including four regional conferences on productivity topics held earlier this year.

'Unique Opportunity'

One of those conferences, convened in Pittsburgh, Pa., August 2-4, considered private sector initiatives to increase productivity. Its final report concluded, in part, that "information management provides a unique and potentially significant opportunity to improve productivity."

"Information handling technologies are not limited to replacing manual paper systems — as important as that may be — but also involve a fundamental transformation of how companies do their business and what their business is," the report stated.

"Instead of creating automation task forces, companies should be establishing task forces on how the harnessing of modern information technology is going to transform fundamentally what they do."

Stressing that point at the recent meeting here, conference chairman C. Jackson Grayson, chairman of the American Productivity Center in Houston, said improving information handling "has to be a top priority of this nation to improve productivity."

The two-day conference brought together several hundred representatives of industry, academia, labor and government.

Getting a big push from the White House, the meet-

ing featured the participation of a number of high-ranking administration officials, including Secretary of State George P. Shultz, Treasury Secretary Donald T. Regan, Commerce Secretary Malcolm Baldrige and Labor Secretary Raymond J. Donovan.

During an early panel discussion on technology, Geof-

frey Place, vice-president for Research and Development at Proctor & Gamble Co., voiced what was to become a conference theme, saying "new technology will work to enhance productivity in all sectors" of the economy.


General Electric Co. (GE) Executive Vice-President James A. Baker, however, was more cautious about the

impact of technology, stating that many firms have "indulged in high-tech snobbery" and "are falling all over themselves" to create a high-tech veneer without fully integrating automation into their operations.

Despite this rush to high technology on a superficial basis, Baker said, "our machines are old, our processes

in some cases primitive." In short, he said, our productivity "is a disgrace."

GE, recognizing that "technology is the steroids we must take to compete against the brute muscle of foreign cheap labor," has invested \$1.5 billion in the last three years to "bring Silicon Valley to our factories," according to Baker.



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An attractive low price plus a long list of features make the 5410 terminal from Teletype Corporation a great value. In fact, it's hard to beat this ANSI 3.64 based asynchronous terminal's cost-effectiveness for applications such as time sharing, inquiry response, data retrieval and software development. Unlike most terminals in its class, the 5410 lets you change from an 80 to 132 column mode so that you can put more data—even accounting spreadsheets—on the screen. No matter which mode you're in, you'll get high resolution with crisp, easy-to-read characters.

The 5410 is also surprisingly user-friendly. For starters, it has 8 programmable function keys that can be down-line loaded from a host or entered locally by the operator. These non-volatile keys are easily associated with screen labels. When the operator goes to another application and changes the function keys, the screen labels can change right along with them. There's no need to put plastic strips or messy tape on the screen.

When it comes to optioning, the 5410 features an English menu (see screen above) for fast set up. The operators don't have to flip DIP switches or figure out complicated codes. They'll also appreciate the 5410's character attributes which include blinking, boldfacing, underlining, non-displayed and reverse video.


Of course, we had the operator in mind when we designed the 5410. That's evident in the detachable, low-profile keyboard that's light enough to rest on the operator's lap. And in the tiltable, non-glare screen with brightness control.

The 5410 also stretches to suit your needs as well as the operator's. For example, it features a standard EIA printer port; the internal software to do editing, split screen and line drawing graphics; and on-line speeds up to 19200 bps.

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The COMPAQ Portable has all the capabilities of a large desktop computer. But now those capabilities can go where you go.

You can move it from office to office to share its resources. You can move it into the conference room to answer questions when and where they come up.

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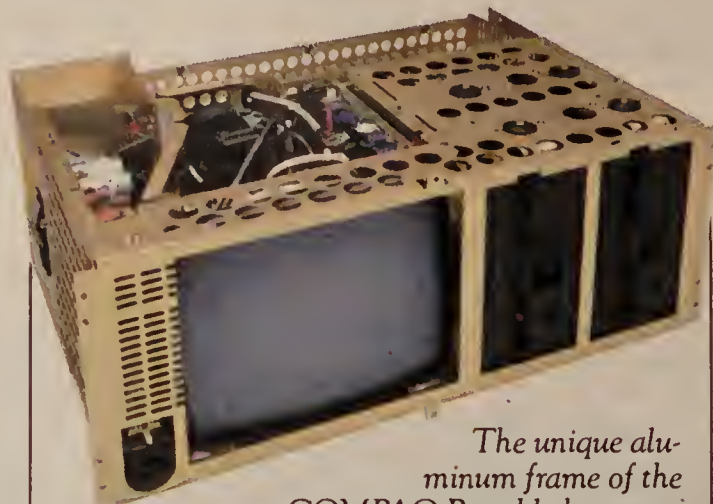
What's more productive than a computer? A computer that works for you in more places.

Works with the greatest number of programs

The most important consideration when you choose a computer is "what programs will it run?" And that's one more reason for choosing the COMPAQ Portable.

The COMPAQ Portable runs more programs

The COMPAQ Portable was designed to fit under a standard airline seat so you can take it on business trips.



The unique aluminum frame of the COMPAQ Portable has cross-members that strengthen it front-to-back, side-to-side, and top-to-bottom. It's a design practice commonly used in race cars.

than any other portable. In fact, it runs more than most non-portables. That's because it runs all the popular programs written for the IBM® Personal Computer. There are hundreds of them. They are available in computer stores all over the country, and they run without any modification, right off the shelf.

Imagine the power of a *portable* word processor. There are dozens of different word processing programs available for the COMPAQ Portable.

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So, you get portability and you don't give

up problem-solving power. The combination adds up to the most useful personal computer on the market today.

Works better because it's easy to read

The display screen of the COMPAQ Portable measures nine inches diagonally. It shows a full "page width" of 80 characters on a line so tasks like word processing are easier. And those characters are big enough to read even if you're leaning back in your chair.

The display shows both high-resolution graphics and easy-to-read, upper- and lowercase characters. One screen



There are hundreds of useful programs for the COMPAQ Portable because it runs all the popular programs written for the IBM.

for all the information. With some personal computers, including the IBM, you can have either the graphics or the legible characters, but you can't have both unless you buy two different displays.

Incidentally, computer prices are often quoted without a display. The display of the COMPAQ Portable is built in, of course.

Add-on options make it work the way you work

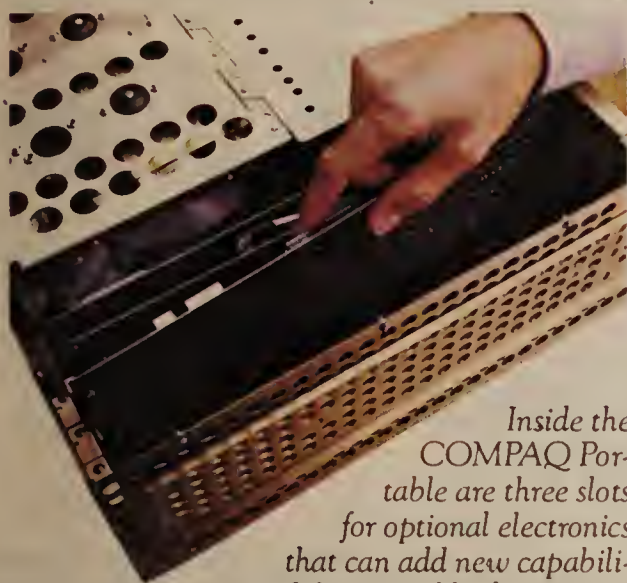
Inside the COMPAQ Portable are three open slots. Electronic devices called expansion boards fit those slots and give the COMPAQ Portable new powers.

Just like the programs, expansion boards designed for the IBM work with the COMPAQ Portable, so there are dozens available right now. With them, you can make your personal computer more personal.

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Want to use your company's central computer files while you're on a trip? There are boards that allow the COMPAQ Portable to communicate with a variety of large mainframe computers.

Other boards let you hook up controllers for computer games or increase memory capacity. Still others let you connect personal computers in a network so several people in your office can share the same information.



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Portable doesn't just mean smaller. Portable means tough, too.

The COMPAQ Portable was built to withstand the hard knocks of constant travel. An aluminum frame within the case completely surrounds the computer's working components. Each disk drive is mounted in rubber shock absorbers instead of being bolted directly to the frame.

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Specifications

Software

- ☐ Runs all the popular programs written for the IBM PC

Memory

- ☐ 128K bytes RAM
- ☐ Expandable to 640K bytes

Storage

- ☐ One 320K-byte minifloppy disk drive, second drive optional

Display

- ☐ 9-inch (diagonal) monochrome screen
- ☐ 25 lines by 80 characters
- ☐ Upper- and lowercase, high-resolution text characters
- ☐ High-resolution graphics

Expansion board slots

- ☐ Three IBM PC-compatible slots

Interfaces

- ☐ Parallel printer interface
- ☐ RGB color monitor interface
- ☐ Composite video monitor interface
- ☐ TV RF modulator interface
- ☐ Communications interface optional

Physical specifications

- ☐ Totally self-contained and portable
- ☐ 20"W x 8 1/2"H x 16"D

The keyboard is detached so it can fit into your most comfortable working position.

The keyboard cable remains connected at all times. So you don't have to unpack it and hook it up every time you use your computer.

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small package on your desk, instead of a big obstacle you have to talk around. The built-in display also avoids the usual cable clutter because there's no need for separate cables for the display.

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Rising Unemployment, Recession Cited

Japanese Labor Unions Reconsidering Contracts

By Patricia Keefe
CW Staff

Rising unemployment and a recession that has finally hit home are forcing Japanese labor unions to reconsider their previous policies of full cooperation with factory management on automation plans. As a result, Japanese factory workers are moving from "psychological" contracts with management for lifetime employment to legal contracts guaranteeing that jobs will not be lost to automation, according to Yoshi Tsurumi, a professor of international business at Baruch College in New York.

This viewpoint was expressed by several U.S. specialists on Japan, robotics and labor relations and was the thrust of recent reports and surveys taken by Japanese government and union officials (see story Page 33).

Specialists such as Frank Stafford, professor of economics of the University of Michigan, and Japanese organizations like the All Japan Federation of Electric Machine Workers' Unions (Denki Roren), predict that factory automation will have a substantial impact on Japan's labor and employment levels.

'Serious Vulnerability'

Heavy reliance on automation has created a "serious vulnerability" in Japan, according to Stafford. He predicted a dramatic period of transition for producers and workers over the next 15 years, similar to the scope of the agricultural revolution that occurred in the U.S. during the 1920s. As Japan becomes more automated, it will produce more goods cheaply, pushing down prices, wages and total revenues, threatening to collapse the economy, he said.

Traditionally, during an economic downswing, Japanese management shares wage cuts and freezes with workers, Tsurumi said. Instead of layoffs, workers split the available hours, resulting in shorter work weeks. In the past, management introduced automation during periods of expanding production, softening the impact through attrition and the reassignment of workers to actual and "paper" jobs, Tsurumi added.

But a slow growth rate over the past two years has forced companies to "tighten up" their number of employees. As a result, the feeling among Japanese workers that they will have a lifetime job with one company is being threatened, he said.

Because robots reportedly eliminate some unskilled jobs, such as painting and welding in auto factories, a Denki Roren survey is said to show a downward trend in the hiring of full-time, female high-school graduates, a traditional recruiting field.

Denki Roren estimates at least 50,000 workers, slightly more than 13%, have been re-

placed by robots, but Tsurumi dismisses that figure as a "red herring." Nonetheless, Denki Roren and other Japanese unions are beginning to push for agreements aimed at protecting workers from what reportedly is viewed as an "alarming trend of robotization."

While the organization of Japan's unions by company

rather than industry precludes any overnight change, some unions, such as auto workers at a Nissan Motor Co. plant outside of Tokyo, have succeeded in executing what some call a model technology agreement for other unions.

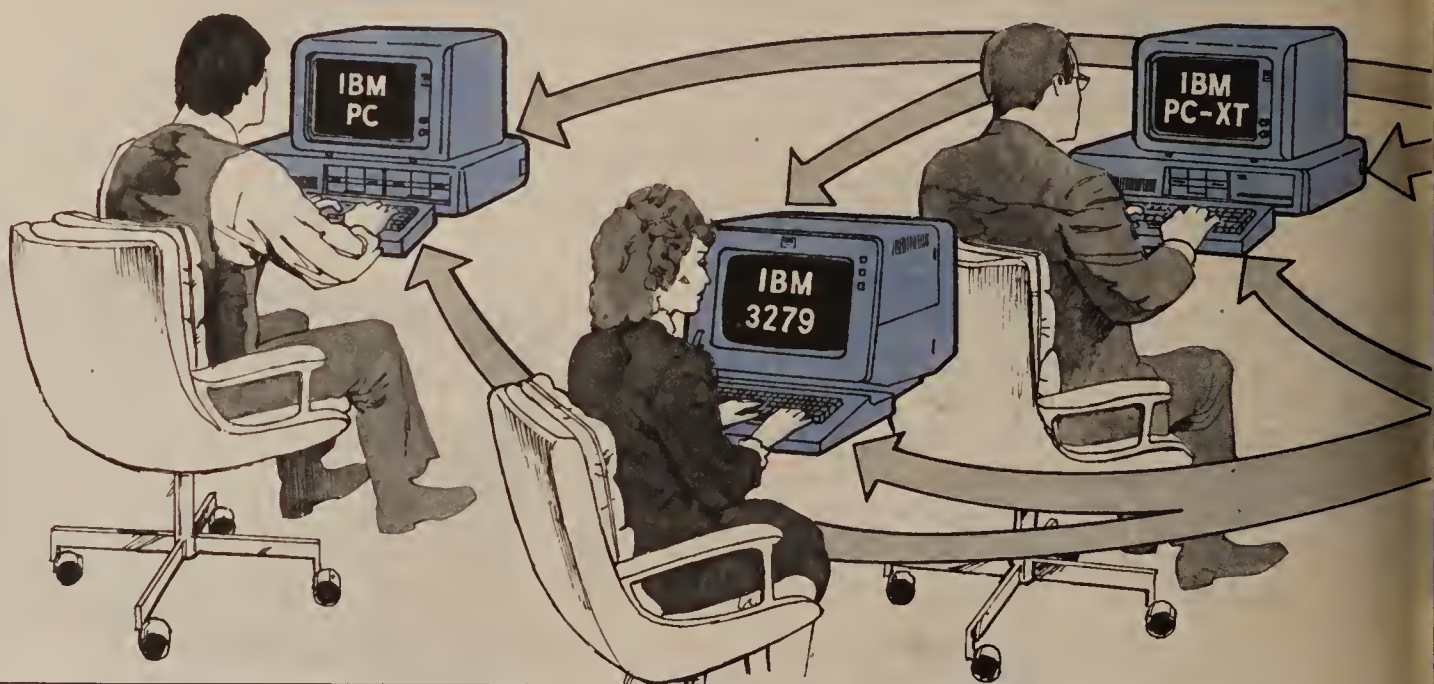
The accord reportedly requires "consultation between labor and manage-

ment," including discussion of the anticipated impact on employees — before the introduction of labor-saving automation — and prohibits the company from laying off workers because of new technology. Nissan promises not to "downgrade jobs, wages or working conditions" and agrees to retrain affected workers.

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Robots Seen Replacing Workers on Japan's Shop Floors

By Patricia Keefe
CW Staff

Japan is one of the leading consumers of robotics in the world, according to the Japan Industrial Robot Association, which estimates there are at least 100,000 robots currently in place on production lines in Japan. That figure is expected to rise to between one million and three million robots by 1989, a period of time in which slow

economic growth is expected in Japan, analysts say.

In contrast, according to the Robot Institute of America (RIA), there were approximately 5,000 industrial robots installed in the U.S. The RIA estimates growth to between 80,000 and 100,000 robots by the end of the decade. Moreover, RIA President Walter K. Weisel warned of a "rude awakening soon on the part of labor

when they wake up and find that thousands of jobs on the assembly line are being replaced by ... robots" [CW, Sept. 19].

A November 1982 survey of 10,000 firms with more than 100 employees undertaken by Japan's Ministry of Labor reportedly revealed that as many as 60% of Japanese manufacturing firms have installed industrial robots or other computer-aided

production equipment. Of the remaining manufacturers, 6.6% were reported to have said they plan such additions within the next three years.

The ministry's conclusion is said to suggest that these firms are not necessarily looking for cuts in production costs to keep a competitive edge, but rather to gain precision and higher quality in their products.

In October 1982, the All Japan Federation of Electric Machine Workers' Unions (Denki Roren) sent questionnaires to 474 union offices; 47% responded. In addition, it chose five companies per type of industrial output, including heavy electric machinery and semiconductors, interviewing employees on the shop floor.

The results reportedly showed that 93% of the workshops surveyed in the electric machinery industry have installed some form of microelectronic equipment. Of these, another 60% reported a drop in the number of employees required as a result of automation.

Cutting Work Force

For example, Mitsubishi Heavy Industries Ltd., Japan's top maker of large machinery, reportedly plans to cut its 58,000-member work force by 9% by 1986.

Denki Roren reportedly has estimated that of the 370,000 employees covered by the survey, at least 50,000, or 13%, have lost their jobs to automation. Those affected are women, middle-aged and elderly workers. Estimates of Denki Roren's membership range from 380,000 to 570,000.

Currently, the Japanese manufacturing work force is said to stand at 13.7 million. If industry estimates on the use of robots are correct, there could be substantially fewer jobs by the end of the decade, according to Japanese unions, who claim that the average robot can do the work of three to four people.

CSI Meet To Be Held On Nov. 7

NEW YORK — A new graduate program for seasoned practitioners and nine general sessions will highlight the 10th Annual Computer Security Conference to be presented at the New York Penta Hotel here Nov. 7-9 by the Computer Security Institute (CSI).

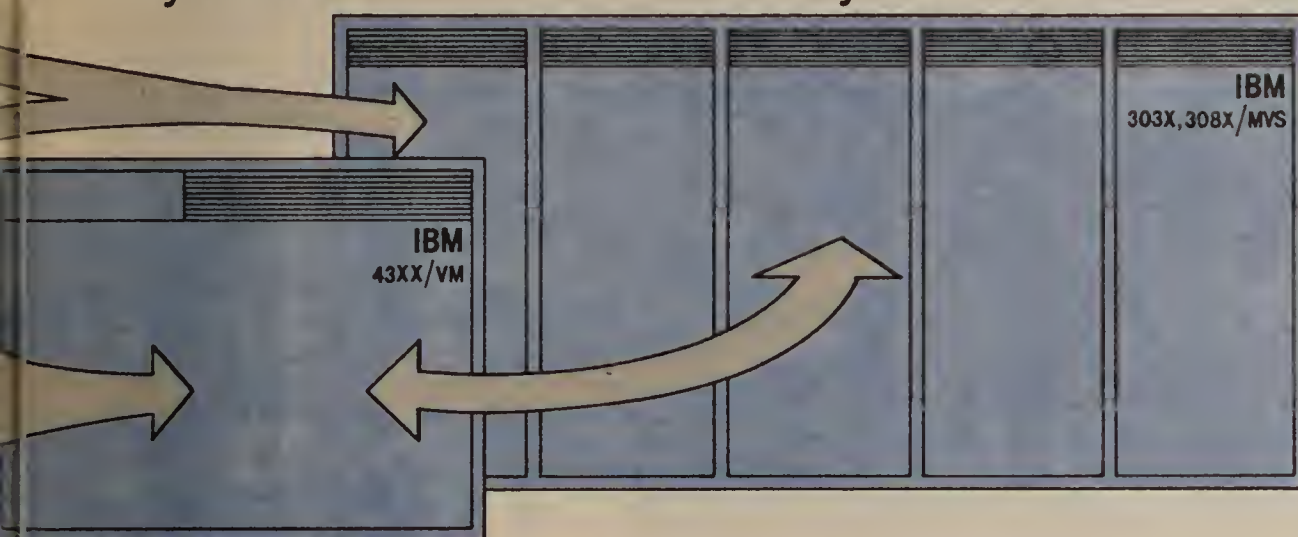
According to CSI, the two-day graduate program for experienced practitioners will feature six special sessions, and the keynote speaker will be Seymour Papert of MIT.

Registration fees are \$545 for CSI members and \$595 for nonmembers; one-day seminar registration is \$175 for members and \$196 for nonmembers. Further information is available from CSI, located at 43 Boston Post Road, Northborough, Mass. 01532.

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Designer Sees Adaptability Key to Ada's Future Success

By Paul Gillin
CW Staff

PARIS — The success of Ada as a commercial programming language will be due to its adaptability to the "software engineering" concept that is generating interest as an alternative to linear programming methods.

"I personally believe that of all the attributes of Ada, this [type of] support of the software components will have the greatest impact on its use," said Jean D. Ichbiah, president and general director of Alslys in La-Celle Saint Cloud, France, and leader of the team that designed the U.S. Department of Defense-sponsored programming language.

"With separate components programmed in Ada, several independent teams can develop applications, and other teams with no relation to them can use those applications," Ichbiah told a large crowd at the International Federation for Information Processing (Ifip '83) Conference held here last week.

Although Ada has received a lukewarm reception from the Cobol-intensive business community, Ichbiah noted that software engineering, which involves breaking a large program down into smaller modules that are designed separately, is an ideal application of Ada's "package" structure. This feature allows the programmer to define groups of logically related items and separate the user interface from the program module. Only the interface is visible to the user, and the two parts can be compiled separately, he said.

Although this structure presents some limitations to creative programmers, it limits the potential damage of internal errors and protects against deliberate or inadvertent tampering, he noted. Shielding the program structure is also far more desirable for the user who typically wants only a guarantee that the program will function. "You shouldn't pollute your user with information about the body of the program," he said.

The "hidden body" of Ada comprises groups of related subprograms and private data types that are transparent to the user. Subprograms may include mathematical functions and private data types, which are internal properties available only to the subprogram bodies.

Because the program tables cannot be accessed directly from outside the package, validation and test are made dramatically simpler, Ichbiah said. It is necessary only to validate the text of the package rather than consider all the other programs that can access its tables.

Ada also includes facilities to generate generic program units that can be viewed as extensions of subprogram parameters, he said. This makes program text smaller and easier to read and limits the possibility of clerical errors. Another feature of Ada that makes it useful for distributed development is its separate compilations of software components. This function makes it easier to break large programs down into more manageable parts.

Once a common interface is defined, program parts can be developed and compiled separately with the interface resident separately. This ensures that recompilation does not affect the interface, he noted.

Ada features also automatically update the program library upon compilation, he said. With languages like Fortran and Pascal, "every time you submit a compilation you produce the same listings and reports," he said.

"With Ada, when you submit a compilation, the compiler has access to a program library and it produces an updated program library. This also lets you check which units are using the obsolete version."

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On Ada, Data Communications Two Teleconferences Announced

ROCKVILLE, Md. — The Institute for Advanced Technology will hold two teleconferences: "Ada — Its Practical Applications" on Nov. 14 and "Data Communications Update" on Dec. 5.

The program on Ada will focus on features of the Ada language including packaging, tasks, generics, exceptions, overloading and user-defined data types and demonstrations of validated Ada compilers.

The seminar will be presented at a level appropriate for technical managers, a vendor spokesman said.

The "Data Communications Update" will feature seminar leader Gary Zielke.

The update will focus on current developments and standards and explore future trends in data communications.

The seminar is recommended for DP managers, operations personnel, systems analysts and network personnel, according to the

vendor spokesman.

The fee is \$195 per person per seminar.

Further information is

available from the Institute for Advanced Technology, 6003 Executive Blvd., Rockville, Md. 20852.

Video Training Series Targets Novice Users of SAS Package

NORTHBROOK, Ill. — Array, Inc. has announced a video training series for the beginning user of the SAS statistical analysis and data management software package offered by SAS Institute, Inc.

The course, developed in conjunction with Advanced Systems, Inc. (ASI) of Arlington Heights, Ill., is designed to show users how to develop SAS programs, modify data, produce reports through SAS procedures, generate fundamental SAS statistics, maintain SAS data sets and format data and han-

dle both SAS and OS files.

The course is geared toward the user community and assumes no prior knowledge of SAS.

Rental price for the video training program, which will be distributed through ASI, is between \$50 and \$100, depending on the size of the lease. More information is available from ASI, 2340 S. Arlington Heights Road, Arlington Heights, Ill. 60005. Information on in-house education is available from Array, 2005 Center Ave., Northbrook, Ill. 60062.

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Helps to Speed Patient Diagnosis

Hospital Cures Backlog With Hard Disk System

WINTER HAVEN, Fla. — Installing a hard disk system was the right prescription for a hospital pathology staff's record backlog here. In addition to providing greater access to the now computerized files, the system helps to speed patient diagnosis and aid the department in its day-to-day duties.

Intrigued by computers several years ago, Carol Staninger, a certified professional secretary at Winter Haven Hospital, saw their potential for compiling and cross-referencing patient records.

She began taking courses in computer technology at nearby Polk Community College, which allowed non-profit organizations to use its computers after hours, at cost, in the hope that these organizations would discover what computers could accomplish.

Although Staninger learned a great deal, years passed before the community-supported hospital could consider an outlay for all the equipment it needed.

"We began with a [Wang Laboratories, Inc.] Wang-

writer to test what word processing could do for us," Staninger said. However, the pathology department "was really waiting for a hard disk system that would have the massive capacity we needed to manage records going back 30 years and covering 150,000 surgical cases," she added.

The department found the system it was looking for in the stand-alone Wang Alliance 250, currently configured with an 80.4M-byte disk drive, a 35 char./sec daisy-wheel printer and two Wang Ergo II archiving workstations.

Three pathologists are on the staff of the 600-bed hospital. They also serve, on a rotating schedule, two other area hospitals with a total of 820 beds. Their schedule is worked out months in advance on the Alliance, which also has calendar and electronic mail capabilities not yet in use at the hospital.

Stores Pathology Records

The system is also used to enter all the hospital's surgical pathology records, a work load that includes some 8,000 surgical cases a year, 15,000 cytology entries, 120 bone marrow reports and documents on about 35 autopsies, Staninger said.

In addition to keeping up with the day-by-day work load, Staninger and assistant Lisa Rizer enter the hospital's massive backlog of files into the Alliance system. "Although we still keep hard-copy records, we're spending much less time shuffling papers now," Staninger reported.

Computerized records provide the staff with easier access as well. The user-friendly system gives the entire office team instant access to critical information, ac-

cording to Staninger. "All we had before were electric typewriters, but the switch was easy," she said.

"Now, we each spend about four hours a day entering data, and it's a breeze. Thanks to the Alliance's functional programming, we can enter each of our 60 to 70 daily cytology reports, for example, using only 10 keystrokes each, instead of 100," Staninger said.

Hospital personnel also like Alliance's security, which requires a password to get into the system and separate passwords to access different libraries and documents. "In the medical field, patient privacy is a prime concern," Staninger said.

She added that the 80,000-word spelling function is a particular boon to hospital word processing operators, who constantly encounter foot-long medical terms. In addition to a main dictio-

nary, the Alliance 250 system allows each user to develop a personal dictionary of special words.

Alliance's word processing capability is used to facilitate consulting and to expedite medical correspondence. "The doctors dictate into tape recorders. Then we transcribe, edit and print," Staninger said.

She has developed about 20 libraries in the Alliance system. Each doctor and each of the two computer operators has one. The others are used for consulting, autopsy, bone marrow and surgical pathology.

"Speed and accuracy are important everywhere in a hospital, but nowhere are they more necessary than in the pathology department. When you can quickly and certainly tell a mother that her three-year-old child's tumor was benign, that's what it's all about," Staninger said.

Computer Law Institute To Meet Nov. 3 in N.Y.

NEW YORK — Computer Law Institute will hold a seminar here Nov. 3-5 focusing on the legal issues of computing, including recent developments in software copyright laws.

At the conference, a panel of attorneys and computer experts will talk about the registering of computer programs, major systems acquisitions, hardware maintenance and performance, anti-trust and leasing and protection of data bases.

Two workshops, one addressing the problems of acquiring, licensing and maintaining mass-distributed software and the second examining tech-

niques of financing and developing major software systems, will also be included in the agenda.

Daniel T. Brooks of Computer Law Advisers, Springfield, Va., is chairman of the program, which will be held at Marriott's Essex House in New York City.

The registration fee for the program, including the course handbook, is \$375. For persons unable to attend the conference, the book can be purchased for \$35.

Further information is available from Nancy B. Hinman, Practising Law Institute, 810 Seventh Ave., New York, N.Y. 10019.

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DEC Group Set for Oct. 17

BOSTON — The annual Digital Equipment Corp. System 1022/1032 Users Group Conference is scheduled to be held here Oct. 17-19.

In addition to discussion of the System 1022 data base management system (DBMS) for the Decsystem-10 and -20 mainframes, the conference will focus on the newly released System 1032 DBMS for DEC's VAX-11.

The conference registration fee is \$165. More information is available from the Software House, which is located at 1105 Massachusetts Ave., Cambridge, Mass. 02138.



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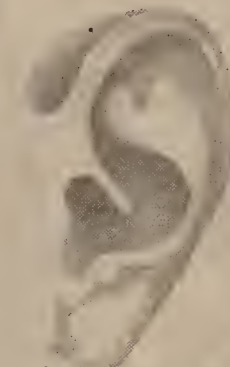
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Portable Proves Invaluable Aid to Paramedics

JAMESTOWN, N.Y. — The recent installation of a personal computer on the dashboard of a paramedic ambulance here has been an invaluable aid in providing emergency medical assistance to area residents, according to the ambulance service's director of emergency medical services.

Utilizing Radio Shack's TRS-80 Model 100 portable computer, the Chataqua County Ambulance Service is able to rush patient information to ambulance staff as they speed to an emergency.

The Model 100 stores the names, addresses and health problems of more than 1,000 patients served in the area.

Helps Medics Prepare

"When dispatch asks you to respond, they usually just give you an address. Based on that information, the computer allows us to know who is there and what medical emergency to prepare for before we arrive at a scene," said Peter Bonadonna, director of emergency medical services for the Chataqua County Ambulance Service. Full patient medical files are accessed in the ambulance and consulted before arriving at an emergency scene.

"Having this information in advance allows us to concentrate on taking care of a person. The crew is finding it an invaluable aid, particularly with serious patients," he said.

A more complete medical history is stored for those high-risk patients who al-

ready have used the ambulance or potential patients who have given their medical records to the ambulance service as a precaution.

Bonadonna said he selected the Model 100 computer because of its small size, built-in programs, full-size keyboard and battery operation.

While neither Bonadonna nor his staff had computer experience, he said they

learned to operate the personal computer in just a few hours.

Stores Instructions

In addition to storing patient information, expanded use of the computer allows the ambulance service to store instructions, keep an inventory of medications and use the function keys programmed to serve as individual message boards for

ambulance staff.

"My staff really likes it, too. We've become very dependent on it," he said.

Bonadonna initiated the use of the computer and paid for it himself. His inspiration came from several hospital emergency rooms that use computers to store patient health records.

The TRS-80 Model 100 has built-in software, a built-in modem and a full-size type-

writer keyboard. Five programs are contained in 32K bytes of read-only memory. The personal computer measures 2 in. by 11½ in. by 8½ in. and weighs approximately 4 lb. It can be powered by four batteries or an ac adapter for approximately 20 hours of operation. The unit has built-in nickel cadmium batteries that maintain the computer's memory for up to 30 days.

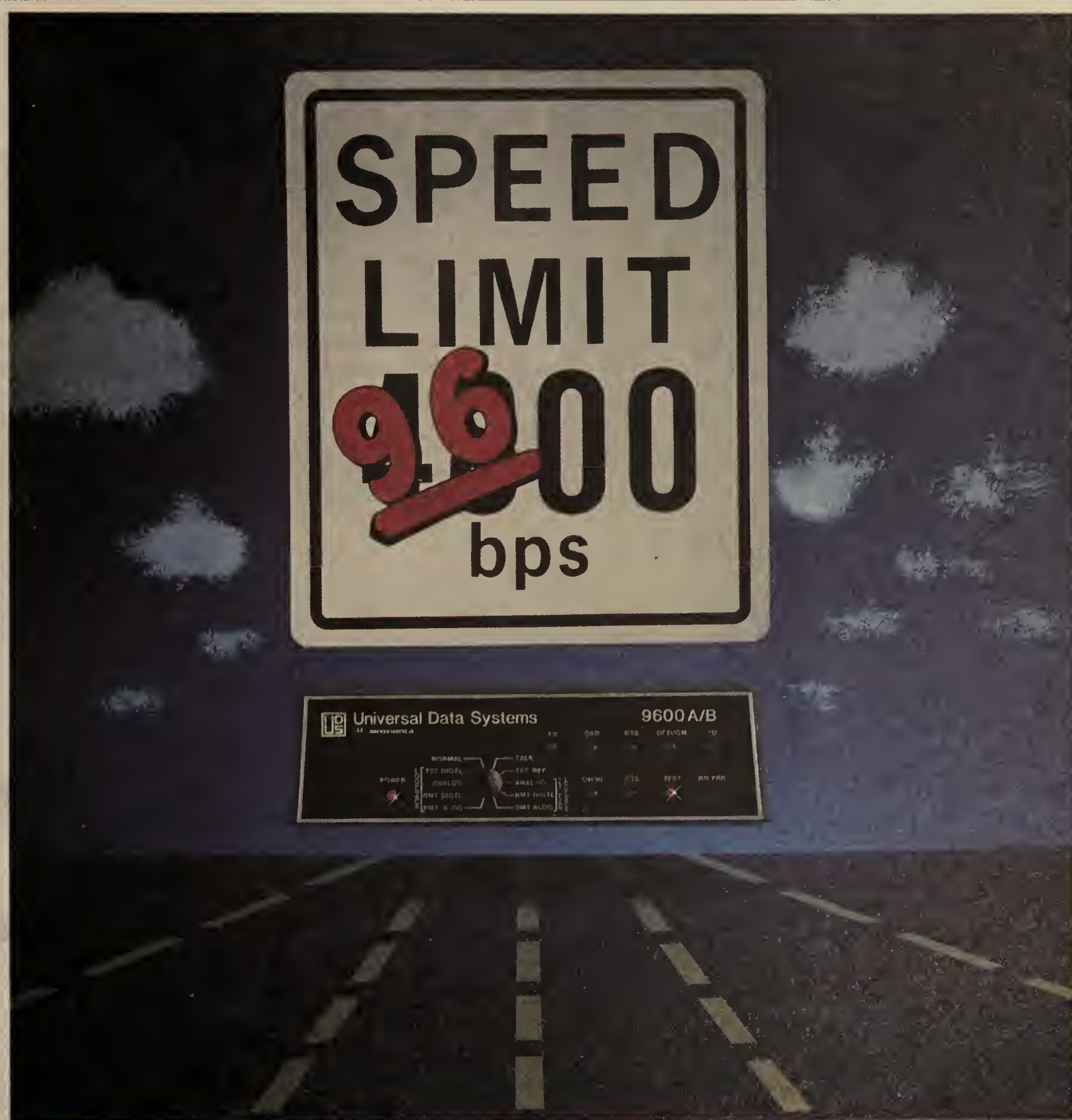
Guide Cites Safeguards For Systems

BABYLON, N.Y. — Pilot Books has published Phillip G. Elam's "Checklist/Guide For Assessing Data Processing Safeguards," a guide to protecting mainframes, terminals and data processing workstations from loss, malfunction and misuse.

The publication includes a checklist to aid organizations in assessing the quality of procedures for protecting the DP facility and evaluating disaster contingency planning.

The guide includes coverage of fire and water hazards, access control, personnel, hardware and software security, files documentation and data protection and various facets of disaster planning.

Priced at \$5.95 per copy, the guide is available from Pilot Books, which is located at 103 Cooper St., Babylon, N.Y. 11702.



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Calendar

Week of Oct. 23

Oct. 24-25, Chicago — **CICS/VS Performance and Tuning.** Contact: Dianne Halper, On-Line Software International, Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024.

Oct. 24-26, Carmel, Calif. — **Managing Information Services.** Contact: American Management Associates, 135 W. 50th St., New York, N.Y. 10020.

Oct. 24-26, Boulder, Colo. — **Local-Area Networks.** Contact: Seminar Broker, Mary Willard, 3213 W. 1133 Ave., Broomfield, Colo. 80020.

Oct. 26-27, New York — **The 1983 Marketing Conference.** Contact: The Conference Board, Inc., P.O. Box 4026, Church St. Station, New York, N.Y. 10249.

Oct. 26-27, Chicago — **Recovery/Restart.** Contact: Dianne Halper, On-Line Software International, Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024.

Oct. 26-27, Anaheim, Calif. — **Software Productivity.** Contact: The Education Foundation of the Data Processing Management Association, Department SP, P.O. Box 3608, 3420 Kashiwa St., Torrance, Calif. 90510.

Oct. 26-28, New York — **SAS Applied Time Series Analysis and Forecasting Course.** Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

Oct. 26-28, Atlanta — **Unix.** Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705.

Oct. 26-28, Boston — **SNA and Today's Telecommunications Environments.** Contact: The American Institute for Professional Education, Carnegie Building, 100 Kings Road, Madison, N.J. 07940.

Oct. 26-28, Washington, D.C. — **How to Build and Use a Data Information Resource Directory.** Contact: Barnett Data Systems, 19 Orchard Way N., Rockville, Md. 20854.

Oct. 26-28, Burlington, Mass. — **Network Communications Protocols.** Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705.

Oct. 26 - Nov. 1, Geneva, Switzerland — **Italtel at Teletcom '83.** Contact: Vera Gandi, External Relations, Italtel, Via A. di Tocco, 13, 20154 Milano, Italy.

Oct. 27, New York — **CBX Evaluation and Selection.** Contact: Marilyn Chasteen, The DMW Group, Inc., 2020 Hogback Road, Ann Arbor,

Mich. 48104.

Oct. 27-28, San Jose, Calif. — **Office Automation: The Hardware, the Software, the Systems.** Contact: The American Institute for Professional Education, Carnegie Building, 100 Kings Road, Madison, N.J. 07940.

Oct. 27-28, New York — **The Fourth-Generation Systems and Languages.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Del-

ran, N.J. 08075.

Oct. 27-28, Dallas — **IMS/VS Dump Reading.** Contact: Data Base Management, Inc., 1075 Tolland Tnpk., Manchester, Conn. 06040.

Oct. 27-28, Los Angeles — **Local-Area Networks.** Contact: Techtran, 72 Cummings Point Road, P.O. Box 10212, Stamford, Conn. 06904.

Oct. 27-28, Cary, N.C. — **SAS Color Graphics Course.** Contact: SAS Institute, Inc.,

P.O. Box 8000, Cary, N.C. 27511.

Oct. 27-30, Washington, D.C. — **Mid-Atlantic Computer Show and Office Equipment Exposition.** Contact: Computer Expositions, Inc., P.O. Box 3315, Annapolis, Md. 21403.

Oct. 28, Anaheim, Calif. — **Structured Systems Development.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

Also being held Oct. 28 in Cleveland.

Oct. 28-29, Chicago — **Data Communications: Advanced Concepts, Products and Systems.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held Oct. 31 - Nov. 1 in San Francisco.

Oct. 28-30, San Francisco — **Applefest/San Francisco.** Contact: Northeast Expositions, 822 Boylston St.,

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Calendar

Chestnut Hill, Mass. 02167.

Week of Oct. 30

Oct. 30 - Nov. 2, Baltimore — The 32nd Annual International Conference and Business Exposition of Data Processing Management Association (DPMA). Contact: Conference Manager, DPMA International, 505 Busse Highway, Park Ridge, Ill. 60068.

Oct. 31 - Nov. 1, Santa Clara, Calif. — Voice-Meets-Data Conference. Contact: Donna Bonyun, Dataquest, Inc., 1290 Ridder Park Drive, San Jose, Calif. 95131.

Oct. 31 - Nov. 1, Milwaukee — Structured Systems Development. Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

Oct. 31 - Nov. 1, Baltimore — Digital Private Automatic Branch Exchange. Contact: The American Institute for Professional Education, Carnegie Building, 100 Kings Road, Madison, N.J. 07940.

Oct. 31 - Nov. 1, Monterey, Calif. — How to Manage Data and Information as a Resource. Contact: Barnett Data Systems, 19 Orchard Way N., Rockville, Md. 20854.

Oct. 31 - Nov. 2, Washington, D.C. — Data Communications: Effective Network Design. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Oct. 31 - Nov. 2, Chicago — Structured Analysis for Users. Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

Oct. 31 - Nov. 2, Chicago — Intech '83 Integrated Office Technology Conference and Exposition. Contact: Integrated Office Technology

Conference and Exposition, National Productions, Inc., 9418 Annapolis Road, Lanham, Md. 20706.

Oct. 31 - Nov. 2, Los Angeles — Ergonomics Legislation and Standards in Europe. Contact: Richard P. Koffler, The Koffler Group, Suite 200, 3029 Wilshire Blvd., Santa Monica, Calif. 90403. Also being held Oct. 31 - Nov. 2 in Boston.

Oct. 31 - Nov. 2, San Francisco — IBM Teleprocessing Software: An Introduction to Concepts, Systems and Applications. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Oct. 31 - Nov. 2, Atlanta — DL/1 Application Programming. Contact: Data Base Management, Inc., 1075 Tolland Tnpk., Manchester, Conn. 06040.

Oct. 31 - Nov. 2, Chicago — Data Communications for Microcomputers: Acquisition Applications and Implementations. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Oct. 31 - Nov. 2, San Francisco — Distributed Systems Designs: Micros to Mainframes. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Oct. 31 - Nov. 3, Fort Lee, N.J. — CICS/VS Logic and Debugging. Contact: Dianne Halper, On-Line Software International, Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024. Also being held Oct. 31 - Nov. 3 in Los Angeles.

Oct. 31 - Nov. 4, Kansas City, Mo. — Structured Systems Design/Structured Program Design Combined Course. Contact: Georganna Carson, Ken Orr and Associates, Inc., 1725 Gage Blvd., Topeka, Kan. 66604.

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Nonimpact Printer Tech Saves Insurer Money

TAMPA, Fla. — Relatively low cost and the potential for expansion of printing capabilities led an international independent insurance agency based here to purchase a printer utilizing a recent development in nonimpact printing technology.

Poe & Associates, a publicly held corporation listed over the counter and on the National Association of Securities Dealers automatic

quotation system, is an independent insurance agency organization with 1982 gross revenues exceeding \$25 million. Its offices and subsidiary companies across the U.S., in London and Puerto Rico serve a primary market of professional liability, casualty and health coverage for professionals and trade associations and for commercial risks.

The company required

speedy, quality print capability for its normal DP needs in accounts receivable, general ledger, financial reporting, financial statements, daily invoicing and monthly statements for its more than 200,000 customers. But Poe & Associates also wanted to save money on its direct mailing costs.

Douglas K. Hudson, vice-president of corporate services, said that new business

development by Poe & Associates is heavily dependent on generating leads via direct mail to potential customers.

"We feel we will be able to save 40% on direct mail to potential customers," Hudson said, when asked about the decision to take delivery of the first Mercurion 1 from Southern Systems, Inc. of Fort Lauderdale, Fla.

Introduced last year [CW,

Oct. 25], the Mercurion 1 is a 60 page/min nonimpact printer using a new technology — ion deposition imaging. High-speed output has for several years been dominated by more expensive techniques such as xerography and laser xerography. The Southern Systems process uses multiple ion beams to charge a dielectric drum, which is then toned.

Chris Frissell, supervisor of programming, said the Mercurion was installed in late March. Having recently acquired an IBM 4341 running under DOS/VSE with 4M bytes of memory, the DP department saw an opportunity to use the relatively low-priced printer to meet the company's expansion needs.

"This opens up large areas for us, such as advertising," he said. "We [in the DP shop] will be able to send out letters that previously went through a [contracted] printer."

Impact Printer Used

The IBM output is also directed to a Southern Systems 600 line/min impact printer that has been dedicated to special forms, customer statements and invoices, Frissell said. Both printers interface with the IBM through Southern Systems' dual port controller, the 32/5.

Large savings — expected from the Mercurion's use of 8½-by 11-in. cut-form sheets — was the major motivation for selecting the ion deposition printer. Cut-form paper is reportedly 50% less expensive than the continuous-form computer paper the shop previously used and is now the standard for all reports.

The Mercurion was installed "with no problem" in three to four hours, but there were some initial bugs in both hardware and software, Frissell recalled. However, he said, Southern Systems personnel "worked very diligently to correct the problems speedily."

The printer has lived up to promotional promises to this point, Frissell said. "But we haven't really pushed it to the limits right yet," he added.



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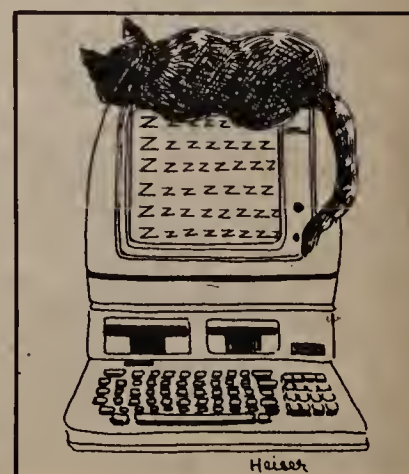
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EDITORIAL

Silence Might Cost Them

An alarming trend is cropping up in the telecommunications industry at a particularly distressing time for users — budget time.

The trend became especially evident in San Diego at last month's Tele-Communications Association annual meeting when NEC Telephones, Inc. introduced its Neax 2400 Information Management System private branch exchange.

The company waxed poetic for about 20 minutes at a press conference on Neax's capabilities, which range from packet switching to local-area networking to information store and forwarding. NEC continued to pontificate on the system's communications, facsimile features and nonblocking architecture before bringing out the champagne.

There was one piece of information, however, that NEC refused to give: the price of the system.

In cases such as these, it would be easy to accept the oft-cited reasoning that because the system in question is an expandable, multifunction system, no one price would be totally accurate.

It would be an easy excuse to accept if most other PBX manufacturers did not give a clue to pricing through descriptions of typical configurations. But they do. Configurations may include the number of lines, terminals, users and any other pertinent information that may qualify the approximate price.

Another vendor also attempted to withhold pricing information recently at a New York press conference. Southern New England Telephone Co. released its Sonecor System 2001 integrated voice and data office system (which, by the way, includes an OEM NEC switching system). After considerable pressure was applied by the press, an approximate price was given.

These are dangerous precedents, especially for users who are now in the midst of planning their budgets. With so many third-generation and superintegrated PBXs coming out, many users may be estimating line items on their 1984 budgets for new phone/office systems.

There is no reason that users should have to call in a vendor and arrange a two-hour or longer sales presentation for themselves and senior management in order to learn a simple price range. Users need to compare systems by some typical configuration prices to plan for the coming year and to determine what vendor should be given a request for proposal.

By withholding prices from the press and, subsequently, the users, vendors also do themselves a disservice. They may ace themselves out of the sales race before it even starts.

While the catch phrase for pricing is often "We're competitive," most users assume that what vendors are really saying is that old line: "If you have to ask how much it costs, you can't afford it."

DATA PAST

Five Years Ago
Oct. 9, 1978

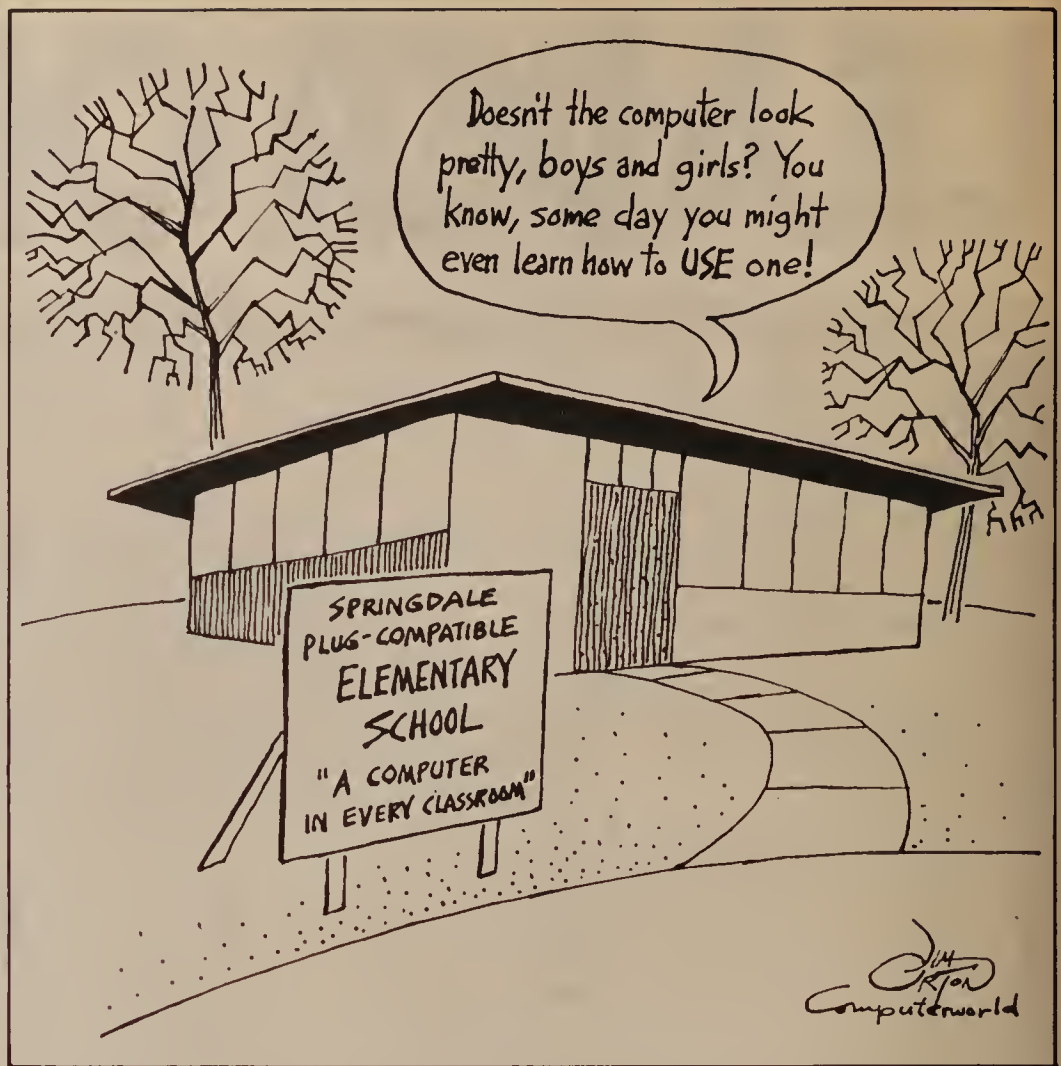
WHITE PLAINS, N.Y. — IBM jumped headfirst into distributed processing with the announcement of the 8100, a system that featured 64K-bit technology and aggressive pricing.

The system was one of the first from IBM to come completely unbundled.

Ten Years Ago
Oct. 10, 1973

SACRAMENTO, Calif. — Then-Gov. Ronald Reagan signed into law a bill making certain software permanently exempt from taxation as tangible, personal property.

Only those programs that are basic operating programs were to be taxed. Excluded from taxation were processing programs.



LETTERS

'Technical Maturity'

The article "Hacking: Mark of Genius or Plain Theft?" [CW, Sept. 12] was very upsetting. It, along with other related articles, implied a now-aren't-you-a-clever-child attitude toward those with the "technical maturity ... to prove their technological manhood." Most, we're assured, are good Jedi knights (like Luke Skywalker), though a few are "misdirected" or (worse) "antagonized" when faced with "police state" and "authoritarian" attitudes.

In my 15 years in data processing, I've been fortunate to work on lots of different projects in about 15 data centers. One of the skills I've developed is the ability to learn to use a data center quickly, to become effective with a short learning curve. This really does mean much in terms of producing effective applications systems.

What I like to consider to be better marks of technical maturity are the disciplines I've developed as I've struggled to design, develop, install, implement, maintain, modify and transfer systems. The technique, or ability, to accomplish work also requires a professional attitude, which includes a set of ethics such as:

- Computer resources are real, bought and paid for for use in company business only.

- A user's/customer's systems/data belong to him and are not to be treated trivially.

- The user/customer must believe and trust your judgment, competence, honesty and integrity.

So am I to believe that I should show my technical maturity by breaking into some private or government data center? Do I list on my resume after hardware/software experience data centers I have accessed? Do I forget that I have seen well-meaning but dumb DPers suspended or canned for activities sig-

nificantly less serious than those of the hackers? Do I want the public's general perception of my profession colored by these white-collar thieves? Do I want to hire these geniuses and struggle not only with the normal new-hire problems but also teach ethics and morality? Do I gently ask such people what they're looking for as they browse through my files so that we can ooh and ah over the intrinsic beauty of my company's financial data?

Diana M. Voisin
Garden Grove, Calif.

Put Them in Jail

Geoffrey Goodfellow, SRI International, Inc. researcher and self-proclaimed hacker, is wrong when he says in the article "Hacking: Mark of Genius or Plain Theft?" [CW, Sept. 12] that hackers are "responsible" and "admirable."

If the kids in my neighborhood take my car for a joyride because they have unrecognized mechanical and driving talents, they should be put in jail. If they enter my office or home just for "innocent activities like browsing" through my property, they are criminals and should be punished.

It's true that the crime is greater if damages ensue. It's also true that I am at fault if I don't have locks on my car, home or office. However, unauthorized entry into my car, home or computer system is always wrong because the possibility of damages is always present. At best, unauthorized access to computer systems comprises theft of services.

It is the height of irresponsibility for Computerworld to print an article so biased toward the intruders. It is ridiculous for SRI's Goodfellow to say "erecting barriers ... is ... the wrong approach to take."

Steve Dibner
St. Louis, Mo.

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READER COMMENTARY/Jay BloomBecker†

And a Little Child Shall Lead Them

News item:

MILWAUKEE (UPI) — One of the youths who tapped into the government's nuclear weapons laboratory computer in Los Alamos, N.M., will testify Monday before a congressional panel looking into computer security problems. Neal Patrick, 17, will appear before the House Committee on Science and Technology.

Fantasy:

Neal Patrick is a strange figure to listen to, as unexciting a "criminal" as one might ever see. He was like a gopher in a field as he hitchhiked along the electronic highways called computer networks. He had stuck his nose up here and there, not knowing where he'd arrived before he got there.

Not brilliant or rich, no weirdo or monk, he's your average upwardly mobile kid who bought the messages of those who said computers are the coming thing (the plastic of *The Graduate*). He smirked and confessed to the assembled congressional multitude that "hacking" was not all that big a thing.

It was this, how commonplace he made everything seem, that made Patrick's testimony so scary. "Unauthorized access" was the term the congressmen who drafted computer crime legislation used to describe the use of other people's computers. Hitchhacking, one southern senator had joked.

But as the highways were to Jack Kerouac, so are the electronic pathways of computer networks for many people, not just a few geniuses. DP networks represent a new diversion, a new direction and a new approach to finding status or self-worth for many.

Millions upon millions of teenagers could be doing this right now,

'As the highways were to Jack Kerouac, so are the electronic pathways of computer networks for many people, not just a few geniuses. DP networks represent a new diversion, a new direction and a new approach to finding status or self-worth for many.'

Carl Sagan was to enthuse later before the same congressional committee that had heard Patrick. It could be the biggest nuisance since joyriding, John Warner of the National Alliance of Parent Teacher Associations warned.

The congressional hearings got surprisingly good ratings in the video channel stations that carried them. Not since Kefauver were such interesting situations the subject matter of congressional consideration: computer widows, psychiatrists with practices limited to "computer alienation" and "addiction removal therapy" and even a few "psychic storm troopers" who offered more strenuous behavioral therapies called "deprogramming."

And oddly enough, people heard what the young man was saying and began to push for change.

People "on the phone" listened most wisely. It did not take long for a number of businesses that depended on computer networking to react to the fact that many teenagers "had their numbers."

Devices to identify and limit the phones that could be used to access a computer system became annoyingly commonplace. Call-back machines, sophisticated password systems and even voiceprint and "computer-print" technology cost us plenty, but had assured that many systems could

offer their users some security.

Privacy concerns had been met with the increased use of encryption so that even if information was read, it could not be understood. Demand climbed for sophisticated programs to govern carefully and monitor reliably all the entries made into crucial computer systems.

Laws were passed, not only updating our criminal codes, but also creating civil liabilities for those "data custodians" who failed to protect adequately the personal data under their care.

At first, there had been an outcry by Steven Wallace of the Data Custodians of America. But once the Uniform Limitation of Liability for Up-to-Standard Computer Systems Law had passed, they, too, consented to the logic of liability. They might grumble about having to keep data protections up to necessary standards, but it sure was better than the agony of a lawsuit.

People were surprisingly more comfortable with the use of computers as they became evermore commonplace and as the antisocial uses of computers became rare, thanks to the high technical level of our protections.

More Responsible Attitudes

The children who had learned the language of computers and commu-

nications first, and demonstrated how easily they could be used for mischief, had led the adults of society to more responsible attitudes. And the adults decided it was about time to return the favor. Reversing a long trend, adults began to lead children once again. Parents began expecting children to be loving and respectful.

The President's Commission on Conscience in Computing chose moral leaders and teachers from the country's cream of the crop and set them to work. They met and sought ways to teach right and wrong in the computer age.

"What is conscience?" they debated, much as Plato did centuries ago. "And how do you program it into a programmer?" his modern counterparts wondered.

But with public relations (finely honed by earlier Swedish efforts to teach citizens about computer vulnerability), with hoopla and hope, the commission had begun.

Respect, and even awe, grew for the power of computing and the responsibility that went along with that power.

Others were learning to apply the same learning to genetic engineering, psychopharmacology and nuclear energy.

Citizens no longer feared for their privacy. Audiences no longer snickered inside when they heard about computer crimes.

And all this because a child showed them how simple it was to use a computer.

Reality:

How far is this fantasy from reality? It depends on you.

BloomBecker is director for the National Center for Computer Crime Data in Los Angeles.

HUMAN CONNECTION/Jack Stone†

They Don't Make 'Em Like They Used to

Recent developments of hand-carried computers have been impressive, but until manufacturers of portables find ways to cut their weight or the suppliers of "laps" toss some decent word processing and file management software into their read-only memories, my desires for portability, at least, will not be met.

In the meantime, I'll have to lug the trusty Processor Technology Sol 20 around in my car, an approach that isn't all that bad. After all, the Sol was among the best in its heyday of the late '70s, and it surely has done the job for many of its aficionados.

My continued operational use of the machine proves, without any doubt, that the half-life of a small computer is a lot longer than 18 months, although making it run does involve some unique methodologies.

Weird Graphics

Early in 1980, I began noticing a peculiar display when I powered up. Instead of the routine cursor, there appeared a string of weird graphics

plastered all over the screen. And the graphics were stuck there; they would not disappear for love or money when I tried to reboot.

I was able to clear them off, finally, after powering up and down a few times. But as time wore on, the graphics showed up more often, and soon the power-switching procedure did not help at all. I found myself removing the cover, pulling the memory and disk controller boards, vacuuming them and cleaning the contacts with alcohol. After replacement, the graphics were nowhere to be seen, and I was able to resume writing at my usual frenetic pace.

Continual transport did not seem to hurt the machine too much, except once when I piled too much luggage on top of it, bending the metal case inward and shorting out a few circuits. Of course, there are not a great many repairmen around to service my equipment; in fact, I can only find one in the greater metropolitan Washington, D.C., area.

In the summer of 1981, the Byzan-

tine graphics started haunting me again at JPL-time, but cleaning the boards did not make them disappear. I'm not much on thermodynamics, but it seemed to me that the chips were running awfully hot, perhaps through age, and that the teensy fan could not keep enough cool air flowing.

So I took a flyer on the notion that some chips were not properly seated because their little feet were crinkled from temperature extremes. I promptly proceeded to push them carefully into their sockets by applying equal and constant pressure on them from my two index fingers.

The 200-Chip Mark

The procedure was not too debilitating to begin with, but when I passed the 200-chip mark, I started to feel weak. After finishing, I was exhausted, but my juices were flowing, so I summoned that last ounce of strength to re-JPL and voila — my cursor was back on the screen, clear and bright as ever. A consuming

feeling of satisfaction came to my senses, the same that is acquired after successfully debugging a complicated program or after a widely erupting wisdom tooth is extracted.

I thought that the JPL graphics were gone forever, but no such luck. It turned out that they reappeared every time I powered up, and my index fingers were taking a terrible beating.

After some intensive research, I discovered some alternatives — first, the eraser tip of a pencil and then the metal bottom of a chemical market. But it started to get to me, and I found myself reseating the chips by gently hashing them with a small hammer.

Then last winter, I implemented a new generation JPL approach, which has been extremely successful: I keep the machine running continuously with the covers off. Of course, when I must transport the machine, I always carry my hammer to start computer operations after arrival at the destination.

LETTERS

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Misleading Info

I was disappointed to read Jack Stone's article "Some Tips for Negotiating DP Contracts" [CW, Sept. 12]. Stone's article contains inaccurate and misleading information on NEC Information Systems, Inc.'s price promotion campaign for its Advanced Personal Computer (APC).

While Stone asserts that the promotion was put together by resellers, it was not. It was developed by NEC and as such, does not represent a "massive unloading." Dealers of NEC equipment are not in fire-sale mode.

Second, the deduction that the hardware must be valued at \$548 if the software is worth \$2,200 is incorrect.

The APC is priced competitively with other advanced 16-bit computers that offer features similar to those marketed by IBM and Apple Computer, Inc.

In addition, Stone's conclusion that the software must be overpriced if the hardware is worth more than \$548, is incorrect. The system, bundled with operating system and five applications programs, includes Micropro International Corp.'s Wordstar, Mailmerge and Spellstar, Ashton-Tate's Dbase II and Sorcim Corp.'s Supercalc and Millionaire software. This combination, if purchased separately, would cost \$4,948. The promotional tag of \$2,748 is the normal list price of the base system alone.

NEC can offer substantial discounts because it is able to negotiate huge bulk purchases from software vendors also interested in the advantages of such a promotion. The bundling of software and hardware is not unique to NEC. Companies such as Zenith Data Systems Corp., Cromemco, Inc., Televideo Systems, Inc., Sanyo Business Systems Corp., and NCR Corp. run similar promotions.

Lynda Welsh
Account Executive
Public Relations

Ingalls Associates, Inc.
Boston, Mass.

Programs' Life Spans

The article "Study Finds IBM Sites Toss 10 Months' Software Yearly" [CW, Aug. 22] was of special interest to me. In November 1977, I reported at Guide on a similar study of several large IBM mainframe sites, most of them inside IBM. In that study, I reported observing an effective long-term program retention rate just under 20% of all new programs written. The report from Techtran Industries, Inc. apparently found the same thing from a larger and more recent sample.

I have repeatedly been asked, "What will be the impact of new development techniques, interactive applications and improved tools?" Others, upon hearing the results of the study, seemed inclined to believe that their installations were different.

The Techtran study strongly bears out that the installations are not unique. With the high death rates of programs that are suggested by these studies, it is time to question the anecdotal "evidence" that programs live long and fruitful lives.

Robert C. Kendall
Hopewell Junction, N.Y.

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THE DATA CENTER

Easing the Impact of DBMS Installations on

When issues involved in the selection, development and implementation of a data base management system (DBMS) are considered, it is often the case that too little time and attention are devoted to the impact of the installation of the DBMS upon the data center function.

Usually, the requirement

to take into consideration — that is, the necessity to provide increased hardware resources to support the DBMS — is given attention, but the effect on the continuing operation of the data center in terms of changes for the data center staff is often ignored.

While the benefits of DBMS, particularly to the

management information systems (MIS) client base — if a fourth-generation programming language is being offered and actively used — can be great and will indeed open many new vistas to members of those client areas, the role of the data center function becomes more complex.

The data center function, under the DBMS, moves from that of having to deal with systems that have failed — often a serious, but rather independent (in terms of the total operation) problem — to that of attempting to deal with the much more far-reaching (global) issues of a failed DBMS.

As progress is made with the installation of the DBMS, the degree of seriousness inherent in the failure of the DBMS also grows. Thus, an increased degree of responsibility and complexity are loaded onto the data center staff.

Data Center Staff

What does such a circumstance mean for the data center staff? It means that these people will be forced to develop additional skills, to understand better the importance of the work they do and to appreciate better the serious complications that can occur as a result of errors within the data center.

These errors will jeopardize not only the smooth functioning of the DBMS, but the entire data center operation. The installation and burgeoning growth of the DBMS in the organization raises the visibility of the data center one more notch.

Just as there was a learning curve associated with the advent of on-line processing (remember the problems some computer operators had understanding the absolute requirement to keep the teleprocessing network in service?), there is a data center learning curve in the movement to the use of a DBMS.

Good planning, communication and cooperation between the data center and the DBMS staff can help mitigate the problems encountered in the transition to the DBMS environment and can shorten the time required to stabilize the DBMS environment.

Must Be Operational

As the success of the DBMS grows and as more of the organization's data is placed under it, the more crucial it becomes that the DBMS always be operational and the data be available. Errors in the data center, particularly in operations, that impair the smooth functioning of the DBMS will very quickly be felt throughout the organization.

The requirement for strong, effective control of the DBMS and for those in the data center to appreciate that need and to accept the necessary constraints required to assure the quality of the DBMS function must not be minimized. It is important to establish, early on, just who has responsibility and authority for the various functions of the DBMS. Once this authority and responsibility have been established, appropriate controls and re-

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Data Centers Requires Planning, Cooperation

porting systems must be put in place to assure the continuation of the operation in the best possible manner.

Of course, political and territorial disputes can be anticipated. Such disputes are, to some extent, healthful in that they often raise important considerations that might otherwise be overlooked.

In addition, the existence of such differences, provided they are kept within realistic bounds, can help generate a dynamism that can be channeled to move the organization forward.

Conversely, improperly controlled, such exercises can take time and attention from other important DBMS issues. That which is clearly in the best interest of the particular organization must be determined, the appropriate decisions made, and then everyone, losers as well as winners, must support the effort.

Primary responsibility for the DBMS must reside with the data base administration function. Like it or not, the data center must understand that in issues involving the DBMS, the data base administration group, not the data center, must make the required decisions.

If the environment is allowed to develop so that the data center can engage in protracted second guessing of the data base administration group or in moving ahead in the data base area on its own, difficulty is certain to follow.

The benefits to be found in the im-

'Primary responsibility for the DBMS must reside with the data base administration function. Like it or not, the data center must understand that in issues involving the DBMS, the data base administration group, not the data center, must make the required decisions.'

plementation and use of a DBMS to the entire organization, not just to MIS, can be substantial. However, the DBMS environment can be a somewhat fragile one, and it must be appropriately managed. This is sim-

ply one more example of the myriad changes we in MIS (and, ultimately, our MIS clients) face, and we must accommodate those changes as best we can.

There are more than sufficient ex-

amples of the failure to manage properly the MIS function. Because the DBMS offers new territory, the opportunity to improve on the rather dismal MIS management record can and should be improved. In the process of moving to such a goal, the need to appreciate the effect on the data center, in all aspects, must not be overlooked.

Murray is director of management information services for Ray-O-Vac Corp., Madison, Wis. He is responsible for worldwide MIS activities. Murray has 21 years of DP experience, 10 of which have been devoted to the management of data centers.

LETTERS

Nothing New

Regarding the article "Help Wanted: DP Execs Turn to Liberal Arts" [CW, July 11], in 1966, IBM Canada had a hiring policy that was similar to that described in the article. As far as I know, it still does.

I graduated with a B.A. in English literature with a philosophy minor and was hired by IBM that year. Others were hired with degrees in geography and history. Recently, someone with a Ph.D. in French was hired.

IBM's policy was to consider any candidate with a university degree. Liberal arts graduates were not specially recruited, but they were not excluded in favor of those with technical degrees. (Those with computer science degrees have in recent years had an edge over other graduates.)

The article does not seem to me to reflect any change in the environment.

Bruce Feuier

Rothmans of Pall Mall Ltd.
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READER COMMENTARY/ Thomas J. Zarecki†

Help Wanted: Applications-Oriented Personnel

Industry is looking for DP employees with strong applications skills, according to trends identified by a special committee formed by DeVry, Inc., a technical education organization.

Periodically, DeVry brings together industry experts to review and suggest revisions in the curricula offered by the company's 10 campuses. During a recent review of the computer science for business program, industry experts cited a shortage of applications-oriented entry-level personnel in their data processing operations.

Companies previously attacked

the problem through extensive (and expensive) in-house training programs. Unfortunately, such programs provided the firms with highly skilled technicians who were unfamiliar with business procedures and communications. The experts surveyed by DeVry found this short-term approach unacceptable in an era of long-term thinking to change trends in technology.

Generalist vs. Specialist

As the complexity of computer systems increases, the computer generalist may become extinct, replaced by the specialist. The future, accord-

ing to the experts, belongs to those who apply their skills to one particular area of operations or one language.

Technical educators realize the ramifications held by new trends and current business personnel requirements. They look to job placement records to attract potential students.

From this recent evaluation, DeVry noted the particularly strong demand for qualified personnel in these seven applications areas:

Off-the-Shelf Packages. One result of the software boom is the growing number of software packages pur-

chased by business, particularly in the accounting field. The trend has led to a reduced demand for those able to create programs and a growing need for those who can modify and manipulate software to meet a company's individual requirements. The experts indicated this field offers immediate growth for maintenance and rework applications programmers, as employees currently handling these tasks are being promoted to other positions and responsibilities.

Minicomputers. Distributed data processing, using minicomputers linked to a mainframe in a network configuration, is becoming increasingly popular. In fact, microcomputer growth currently outpaces that of mainframes. Those who understand and are able to work with minicomputer networks will find their skills in demand.

Microcomputers. Microcomputers are rapidly becoming a supplement to large mainframe systems. Microcomputers handle smaller tasks and free mainframes to handle major problems. As a result, systems are being developed to allow mainframe files to be loaded into the smaller units. Graduates skilled in both types of computers may find growing opportunities as a result of this link.

Large and Small Shops. Growth in smaller computer systems is greater than that in larger operations. Even though internal growth in mainframes should be between 10% and 20% in the next 10 years, an estimated 80% of mainframe budgets cover maintenance, again providing an opportunity for those with the right skills.

Interactive Systems. Interactive systems, especially those with data communications networks, are becoming quite popular. Such systems reduce hardware costs and allow data processing centers to function as service centers, providing a variety of users with a variety of operations. Experience with such a system is essential for a potential employee.

New Program Development. Even with the growing use of off-the-shelf software, certain applications require specific programs. With the lowered cost of hardware, programming time has become the most expensive aspect of system design. Simplified coding brings the cost down, opening a world of opportunity to graduates with the proper skills.

Programming Languages. Cobol is still the primary language for businesses, with enhanced Basic versions gaining in popularity among microcomputer users. Since languages are often determined by the system's manufacturer, the experts suggested students closely monitor industry trends.

Students should be prepared to work with a variety of systems. To take advantage of available resources, companies favor a trend toward "total information centers," employing a variety of hardware, software and programming levels.

Zarecki is manager of computer science curriculum development at DeVry, Inc.

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State Keeps Pace With Application Generator

DOVER, Del. — Beginning in 1978, the state of Delaware's Department of Health and Social Services (DHSS) recognized the need to modernize computer services to keep up with current needs.

An updated system was needed to respond to increasing service demands, deliver client services more cost-efficiently, recoup child support revenue for the state and comply easily with changes in federal and state regulations, according to Reese E. Robinson, executive assistant for Management Services at DHSS.

With a limited budget and a low state salary structure, a means had to be found to implement an agencywide, full-function information system. After DHSS analyzed the economics, the de-

velopment personnel availability and time frame, it made a strategic proposal to the governor to establish a small data center within the agency.

The recommendation was not to attempt to convert the old batch systems being run at the state's central data processing site, but rather to select an application generator that would allow key members of the eventual user community to do much of the system design and implementation, Robinson said.

In November 1981, the governor authorized the establishment of such a center for DHSS, slated to serve the six state hospitals, various community clinics, welfare and food stamp programs, foster care-protective services and child support enforcement, as well as other agency projects.

DHSS ordered an IBM 4341, selected a vacant hospital wing for a computer center and let contracts for renovation, management assistance and basic application planning. The basic implementation tool was IBM's Patient Care System-Application Development System (PCS-ADS) application generator, with extensions from PCI Systems, Inc. of Cincinnati.

The processor and MVS system software were implemented in March 1982. In April, the Patient Accounting/Client Tracking (Pact) system — the heart of the integrated, departmentwide information system — was initiated.

By August, Pact was in the final stages of pilot test; the other three major applications were into or ending their

(Continued on Page 57)

Auditing Tool Supports IBM's CICS/VS

OVERLAND PARK, Kan. — HLE Systems, Inc. has announced the release of CICS Telescope II, an auditing tool designed to monitor the use of on-line terminals. It is designed to support IBM's Version 1, Release 5 of CICS/VS for the DOS/VSE operating system.

The system is said to capture all information entered and displayed on a CICS terminal for later processing by a batch print program. According to the company, multiple terminals can be dynamically selected and audited during the execution of CICS. The system also includes a status display program to show usage statistics and current terminals being audited.

CICS Telescope II is available with source code and documentation at \$2,000 for a permanent license.

Further information is available from HLE Systems, P.O. Box 4714, Overland Park, Kan. 66204.

For DOS/VSE, VM/CMS, OS/MVS Sites

Release of CA-Universal Out

JERICHO, N.Y. — Computer Associates International, Inc. has announced Release 1.1 of CA-Universal, a relational database management system for IBM DOS/VSE, VM/CMS and OS/MVS sites.

According to a spokesman,

the new release offers extended screen design and development facilities and enhances Help functions for end users and programmers. The release allows CA-Universal to be shared across multiple CPUs and accessed from different operating

systems.

The package is said to include an extended applications interface, which allows the CA-Universal relational query language to be embedded in Cobol, PL/I, assembler and CA-Earl programs.

The company said that performance has been improved on a systemwide basis by 24% to 30%, with the reduction of I/O processes and paging. The release reportedly features on-line Help functions and extended mathematical facilities, in addition to editing facilities compatible with standard Cobol editing formats. Output data can be generated dynamically, based on computations performed on existing fields.

CA-Universal is available for \$110,000 for DOS/VSE and VM/CMS users and for \$140,000 for OS/MVS users.

More information is available from Computer Associates International, which is located at 125 Jericho Tnpk., Jericho, N.Y. 11753.

Informatics Announces 'Mark V' CICS Version

CHICAGO — Informatics General Corp. announced recently a CICS version of its Mark V IMS applications generation system and an option to simplify source code for the firm's maintenance and support customers.

According to an Informatics spokesman, Version 4.1 of Mark V in both CICS and IMS versions includes output of a design manual on request with every generated application. The document reportedly includes overall summaries on

screen-to-screen flow, data base usage, a field reference index and summaries for each individual screen.

Programmers using the latest release can write subroutines that simplify program development, allowing them to put common processing requirements into modules for reuse, a spokesman said.

Other added features include PL/I support for IMS/DC which, Informatics said, allows users to communicate with PL/

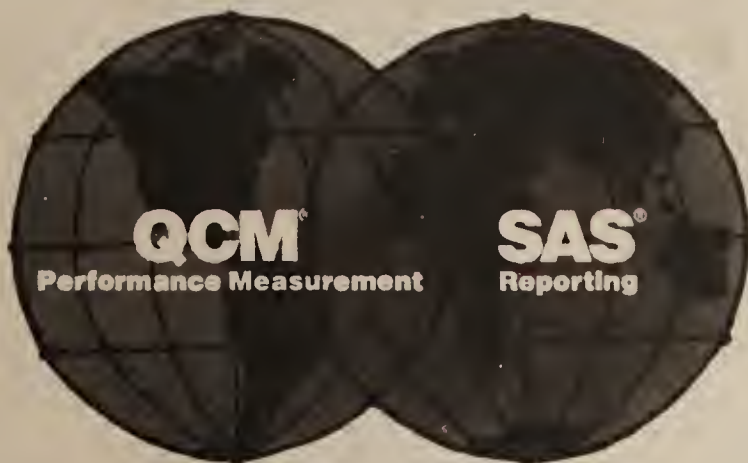
(Continued on Page 52)

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Wang Enhances 'HRMS'

LOWELL, Mass. — Wang Laboratories, Inc. has introduced Inter-Pay, a major enhancement to its Human Resource Management System (HRMS) software package.

The release is a tool developed to automate payroll functions that typically involve manual processing.

Inter-Pay was designed to automate out-of-cycle payrolls. According to industry research, payroll errors occur so commonly that manual check processing has become a standard procedure for each pay period.

Payment errors and omissions usually are not discovered until after a payroll has been completed, necessitating manual processing of certain checks in lieu of a costly and time-

consuming rerun of an entire payroll.

Inter-Pay enables users to create payments and perform all necessary tax calculations without user intervention, other than selecting the employee file and acknowledging the payment or reversal by using a program-specified function key. It can also be used to produce supplementary and bonus payrolls more easily and quickly, a spokesman said.

Last April, Wang released Multi-View, the first enhancement to the HRMS. Multi-View serves as a single, standardized report generator designed to maximize timely management reporting and productivity.

The one-time license fee for the HRMS package, including Inter-Pay and Multi-View, is \$40,000.

More information on the HRMS package is available from Wang Laboratories, 22 Alpha Road, Chelmsford, Mass. 01824.

Trak Monitor Supports IBM

MILLBRAE, Calif. — The Bridge, Inc. has announced Trak, an on-line project management system for IBM CICS/VS or TSO users.

Trak was designed to help managers monitor project status and resources from small maintenance functions to major development projects, the vendor said.

The system operates with IBM's DOS operating system. Most of the programs are written in Cobol.

Trak is priced at \$8,000, and lease plans are available from The Bridge, 199 California Drive, Millbrae, Calif. 94030.

Informatics Offers CICS For 'Mark V'

(Continued from Page 51)

I subroutines and provides more flexible branching capabilities for ease of programming. Additionally, programmers are able to put Mark V libraries on IBM 3380 disks, the spokesman said.

Release 4.1 is available free of charge to all current Mark V users who are parties of Informatics annual improvement maintenance and support agreement. The CICS version is priced at \$24,000 for DOS and \$36,000 for OS.

The Mark V Programmer's Workbench simplifies the source code for the applications generation system, the company spokesman said. It is currently operational under IBM's Interactive System Productivity Facility/Program Development Facility.

Subscribers to Informatics' annual improvement maintenance and support service will receive the option at no charge. It can also be delivered on special order for \$200 plus shipping from Informatics' Software Products Group, which can be reached through P.O. Box 1452, Canoga Park, Calif. 91304.

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'Base MRP,' 'SPC' Packages Out in Dibol for DEC PDP-11

MONTROSE, Calif. — Mini-Computer Business Applications, Inc. has released the Base Material Requirements Planning (Base MRP) and Standard Product Costing (SPC) packages in Dibol for the Digital Equipment Corp. PDP-11 running under the RSTS/E operating system.

The SPC package is said to interface with the company's inventory management and bill of material processor packages to maintain standard and estimated costs for manufacturing and accounting management. The package tracks value-added costs at each level of the bill of material and separates both standard and current costs into mate-

rial, labor, fixed burden and variable burden costs. The company reports that the package allows "what-if" cost analysis.

The Base MRP package with master scheduling is reportedly designed to introduce small and medium-size manufacturing companies to the essentials of MRP. The package supports time-phased requirements generation for all levels of the user's product structure.

Source code licenses for the packages are available at \$3,000 each for use on the first computer from Mini-Computer Business Applications, 2441 Honolulu Ave., Montrose, Calif. 91020.

System/38 Utility Unveiled

OAK BROOK, Ill. — Michaels, Ross and Cole Ltd. has announced the MRC-Manager, Version 1.1, which the company describes as an IBM System/38 utility designed to allow nontechnical managers to access System/38 information. It is for use on the System/38 Control Program Facility Release 5.0.

According to a company spokesman, Version 1.1 of the MRC-Manager makes use of the System/38's Release 5.0 data access method, yielding improved response for users. The package is said to be self-documenting.

The system is comprised of four modules: MRC-Dictionary describes the data base to the MRC-Manager system; MRC-Reporter allows report writing; MRC-Grapher accommo-

dates graph creation; and MRC-Retriever handles on-line retrieval of information. The company said MRC-Manager allows media-independent query capabilities to management or staff personnel. All modules in the MRC-Manager series are said to allow multifile access, and a high-level security subsystem is integrated to the System/38's security to provide protection.

Each of the MRC-Manager modules is priced at \$1,140. Additional information is available from Michaels, Ross and Cole, Suite 501, 1301 W. 22nd St., Oak Brook, Ill. 60521.

'IFS' Designed For Integration Of Accounts

INDIANAPOLIS — The Indiana National Bank has introduced the Integrated Financial System (IFS), said to provide for the integration of all major customer accounting systems on-line.

The total system includes demand deposit application (DDA), the customer information file (CIF) and the time deposit application (TDA).

The integrated data base systems are supported by IBM's IMS DB/DC environment and provide processing on either the IBM 30 series or Amdahl Corp. host computers using IBM's MVS operating system.

According to the vendor, IFS benefits include interapplication communications, improved information both for internal and customer use, ease-of-product development and improved expense control.

A complete software package costs \$500,000. Alone, CIF costs \$100,000; CIF/TDA costs \$250,000; and CIF/DDA costs \$350,000. Further information is available from The Indiana National Bank, One Indiana Square, Indianapolis, Ind. 46266.

System Targets Inventory Stats, Runs on DPS 6

CINCINNATI — Blue Chip Financial Systems Co. has announced the release of its parts inventory and purchase order system operating on the Honeywell, Inc. Level 6 DPS 6 minicomputer under the Gcos Model 400 operating system.

Designed for use by warehouse personnel, the menu-driven on-line system features inventory/purchasing statistics such as vendor performance, inventory usage and parts number purchasing history, according to a vendor spokesman.

Additional features of the system include the ability to assign and cross-reference a company and vendor part, establish minimum and maximum stocking levels and automatically generated purchase orders for unfilled requisitions, according to the vendor.

Priced at \$15,000, the system is available from Blue Chip Financial Systems, which is located at 6680 Dixie Highway, Fairfield, Ohio 45014.

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Program Offers Cobol File Documentation

WASHINGTON, D.C. — Information Concepts, Inc. has released Cobconv, a program to provide documentation and conversion of IBM Cobol file descriptions, which is said to reduce Cobol file description conversion time.

According to the company, the system is comprised of a series of modules that parse the Cobol file de-

scription, create comprehensive documentation and produce input statements to be used with other languages. The main module is said to read and parse any valid IBM Cobol file description, and it produces a table of the file layout which can be used as technical documentation.

Other modules are available to generate input statements for the file description that can be used with other languages. Currently supported languages and packages include PL/I, Fortran, RPG, SAS and Easytrieve. Cobconv is said to support all Cobol input file description constructs.

The package is available in three formats; as a stand-alone module, as the SAS procedure Proc Copylib and

as an interactive module under VM/CMS and TSO controlled through the SPF dialog management facility. The main module and documentation capability are available for a perpetual license fee of \$1,550. Each lan-

guage or package generation capability costs an additional \$300.

More information is available from Information Concepts, Inc., Suite 600, 1110 Vermont Ave., Washington, D.C. 20005.

System Helps Delaware Modernize

(Continued from Page 51)

conceptual design stages. Those applications included the Delaware Client Information System; the Child and Youth Center Information System (Cycis); and the Automated Child Support Enforcement System.

Users designed the systems, while consultants assisted with the implementation and augmented the staff of three applications programmers. Prototyping was used extensively, and structured development methodology was rigorously adhered to, Robinson said.

"Using the application generator eliminated significant portions of the detail design phase and the entire coding phase except for complex functions, such as benefits computation, which can best be performed in Cobol," said Frances S. Abernathy, president of Abernathy Business Consultants, Inc. of Rockville, Md., and project director on her firm's management services contract with DHSS. "Its use also facilitated all testing phases."

During pilot testing of Pact with the Master Client Index and installation of the client tracking system, work began on implementing two additional Pact applications — the immunization registry and the hypertension tracking systems. These were all developed in parallel with detail design and prototyping of the Cycis, which has both Case Management and Resource Management components, Abernathy noted.

The big DP productivity gain was in the small amount of professional resource needed, since the majority of the personnel resource used in definition, design and development phases were from the user organization, she said.

"More of the people resources were applied in the design phase than under traditional development, primarily because of the prototyping performed in this phase, while the actual development phase was reduced because the expansion of the prototype to complete the functional system was easier," Abernathy said.

The test phase is in pilot testing and acceptance testing, which have reduced resource requirements, Robinson added.

"The performance and stability of the system have shown to be excellent, now that the system is under load," Abernathy said. "PCS-ADS compiles directly into object code, with apparently a very small — maybe 10% — penalty compared to quality-written Cobol. Furthermore, it is easy to debug and enhance."

'Adders' Mapping Aid Enhanced

ATLANTA — Rendeck Corp. recently announced Release 2.3 of its Adders Mapping product, an on-line map generator and programmer productivity aid for CICS users.

The product features a map prototyping facility, enabling viewing and demonstration of prototypes of applications. Fields reportedly can be filled with likely data, and the flow from screen to screen can be demon-

strated to end users prior to any programming being run; additionally, hard-copy printouts can be created for documentation.

The price of a perpetual license for the product is \$3,000 for systems running under IBM's DOS/VSE and \$5,000 for those running under IBM's OS/VSI and MVS. Rendeck is located at Suite 7211, 72 Perimeter Center E., Atlanta, Ga. 30346.

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'Aide' System Develops Business Applications

CAMBRIDGE, Mass. — Oasys, Inc. has announced the Aide system for high-productivity business application development on Digital Equipment Corp. VAX-11 systems operating under VMS.

According to the company, application programmers can develop business applications in Aide in one-tenth the time required using Cobol. The applications are said to be readable and easy to maintain and can be transported with no modification to a variety of minicomputer and microcomputer systems.

The company said Aide is written entirely in C and also runs on Prime Computer, Inc. computers operating under Primos and on a variety of Motorola, Inc. 68000-based microcom-

puters. The package contains the following integrated productivity components: data manager, procedure language and interpreter, pro-

cedure editor, interactive debugger, error monitor, form master editor, data input editor, report writer, security system, foreign procedure inter-

face and menu-driven access.

The Aide package is available for \$9,500 from Oasys, 60 Aberdeen Ave., Cambridge, Mass. 02138.

Applied Software Unveils Full Screen Editor

PALM BEACH GARDENS, Fla. — Applied Software, Inc. has introduced FSE+, an editor, data set manager and job output previewer facility for IBM's TSO environment.

FSE+ is a full screen editor with integrated file listing, JES sysout previewing, file management facilities and split-screen support.

The full screen editor supports files with logical record lengths up to 4,096 and customer-defined tun-

ing parameters to control the amount of virtual storage used. Both disk and virtual storage edit work files are supported, according to the vendor.

The software supports all IBM 3270 series terminals operating under Tcam or Vtam with MVS, SVS and MVT operating systems.

The monthly lease charge is \$220, which includes full software support and maintenance, the vendor said.

Further information is available

from Applied Software, which is located at Suite 250, 840 U.S. Highway 1, P.O. Box 13027, N. Palm Beach, Fla. 33408.

Enhancement To 'Proc-Secure' Announced

CALEDONIA, N.Y. — Systems Associates, Inc. recently announced an enhanced release of its Proc-Secure, Version II package, a menu-driven security system that is said to enhance the IBM System 34/36 System Support Program security by providing security block-out at the procedure level.

With the product, use of the protected procedures will reportedly be restricted to secured user IDs, allowing sensitive procedures to reside on departmental menus.

Protection can also reportedly be designated to procedures such as Remove to restrict use to knowledgeable personnel.

Priced at \$150, the system is available from Systems Associates through P.O. Box 64, Caledonia, N.Y. 14423.

FSS Consulting Develops System For IBM CPUs

NEW YORK — A sales and marketing distribution system (SMDS) designed for medium to large manufacturing companies using an IBM 370 or a larger series mainframe has been developed by FSS Consulting Corp.

SMDS is an on-line system that operates under DOS or OS in a standard IBM CICS network environment. It uses standard Cobol integrated with a Vsam relational data base structure.

Designed as a modular system, SMDS handles such functions as order entry, customer service, credit checking, inventory control, warehouse location, pick and pack, invoicing, traffic and distribution, return goods, promotional allocations, materials manufacturing, accounts receivable, security, sales and marketing and end-of-day reporting.

Minimum hardware requirement for SMDS is an IBM 370, 4300 series or 30 series mainframe with 100K bytes of main storage and a tape drive for backup storage, according to the vendor.

The price of the system depends on the number of modules desired. A complete system with all modules, including 100 days of on-site support for installation and training, source code and procedural documentation, costs \$400,000 from FSS at 100 Park Ave., New York, N.Y. 10017.

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'Microforesight' Delivers CPU-Micro Tie

NORCROSS, Ga. — A decision support package that is said to deliver full compatibility between a mainframe and the IBM Personal Computer has been announced by Information Systems of America, Inc. (ISA).

According to the vendor, Microforesight is the micro version of Foresight, its decision support system for various mainframes.

Both mainframe and microcomputer versions are written in English and operate on the same command structure.

The base price of Microforesight is \$2,000. More information is available from ISA at 6855 Jimmy Carter Blvd., Norcross, Ga. 30071.

Videotex Service To Offer Reports On Commodities

NEW YORK — Merrill Lynch Futures, Inc. announced here recently that it will provide daily market research data on 10 key commodities through Agridata Network/Agristar, an agricultural videotex service operated by Agridata Resources, Inc.

Users equipped with personal computers, word processors and videotex displays can access the service by modems through local or toll-free telephone lines from anywhere in the U.S. and more than 2,000 cities around the world, a spokesman for Agridata said.

The network features a total of 25 information sources, including the Des Moines Register, the Commodity News Service and Associated Press.

The service fees include an annual membership fee of \$399, which includes software interface, an on-line charge of \$25 per hour and fees ranging up to \$1 to access a particular report.

The service is retailed through Radio Shack stores. Further information is available from Agridata Resources, located at 205 W. Highland Ave., Milwaukee, Wis. 53203.

McAuto Tool Said to Support IBM Terminals

ST. LOUIS — The McDonnell Douglas Automation Co. (McAuto) said its interactive graphics software will now support IBM's graphics terminals.

The Stradis/Draw package for modeling structured systems will now run on IBM Models 3278 and 3279 as well as its original Tektronix, Inc. 4112 and 4113 supporting terminals, the company said.

The graphics software runs on IBM mainframes under the MVS/TSO or VM/CMS operating systems.

Price is \$50,000. It is now available from McAuto, located in St. Louis, Mo. 63166.

Running Under VMS

'Vsort' Release Unveiled for VAX-11

LEXINGTON, Mass. — Evans Griffith and Hart, Inc. has announced the release of Version 3 of Vsort, its fast sort package running

under VMS on Digital Equipment Corp.'s VAX-11 computers.

The release is said to sort large files 20% to 50% faster than was pos-

sible under the initial release of Vsort. Vsort reportedly handles fixed-record-length, relative, sequential and Ross/V files with support for both span and nonspan records. Version 3 also sorts huge records, which the company said can be as large as 64K bytes for user-managed records.

The updated version is also said to feature support for user-written comparison routines. Vsort accepts user-written record comparison routines that are compatible with the VAX-11 sort.

Version 3 of Vsort is available for \$2,500 from Evans Griffith at 55 Walham St., Lexington, Mass. 02173.

Graph Utility Out for System/38

OAK BROOK, Ill. — Michaels, Ross and Cole Ltd. has announced MRC-Grapher, Version 1.1, described as an IBM System/38 graph utility for use with the MRC-Query series. It is designed for use with the IBM System/38 control program facility Release 5.0.

According to the company, MRC-Grapher allows nontechnical managers to access System/38 information.

It is reported that MRC-Grapher works with MRC-Dictionary and makes use of the System/38 Release 5.0 data access method.

The MRC-Grapher module is available for \$1,140, as are the other modules, according to the vendor. Additional information is available from Michaels, Ross and Cole, located at Suite 501, 1302 W. 22nd St., Oak Brook, Ill. 60521.



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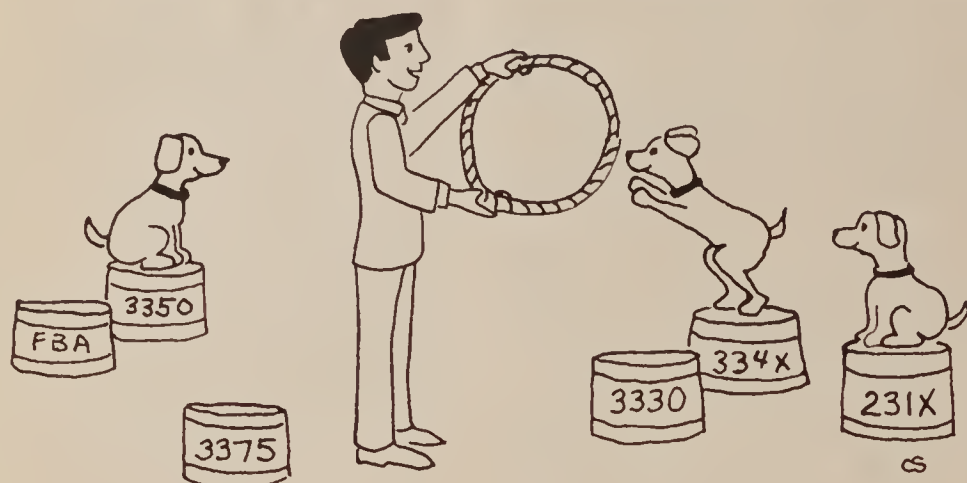
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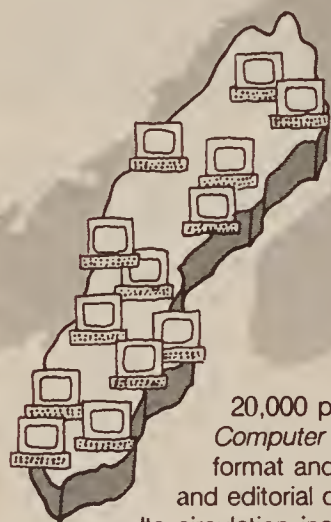
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'Diskus' Studies Disk Usage For IBM System/34 Shops

ELK GROVE VILLAGE, Ill. — Information Specialists, Inc. has made available the Disk Utilization System (Diskus), which the company said allows System/34 users to analyze disk usage by cost center and/or application.

'Paxnet' System Announced For IBM, Intel

NORTH EASTON, Mass. — Phoenix Software Associates Ltd. is touting its Paxnet system as the first local-area network software to provide a true distributed processing environment for the IBM Personal Computer and other Intel Corp. 8086-based computers.

Operating under Microsoft, Inc.'s MS-DOS, Paxnet is said to offer compatibility with both Unix and mixed MS-DOS/Unix environments running on such local-area network hardware as Ethernet and Arcnet. The company said Paxnet allows the sharing of devices and unrestricted files on a system, including up to 255 individual Personal Computers, printers or gateways to other networks. The system is said to be ideally suited to support and control the sharing of data in departmental configurations.

According to the company, a user's access to computer resources is not limited to those available at his workstation because Paxnet turns each node into a window on the entire network and on any other networks connected to it. The system allows access to any unrestricted disk file or program in any disk drive on the system from any point in the network. Further, the system allows users to employ any device on the system, including remote disk drives and stand-alone peripherals.

Software programs can be stored in centralized places and can be downloaded to any computer on demand. Users can share programs, which may be easily updated.

A limited license for the Paxnet system is available for \$250,000 for builders of large local-area networks. A license for 500 nodes is available for \$50,000, plus \$50 for each node beyond 500. The basic Paxnet license can be obtained for \$10,000 plus \$200 per node from Phoenix Software Associates through P.O. Box 207, North Easton, Mass. 02356.

The vendor said Diskus users can generate reports and graphs to manage their disk requirements. The system is said to maintain automatically such information as date file attributes last changed, maximum number of records in a file and date attained and file efficiency percentages. File efficiency data can be calculated based on current records in a file or on maximum records, and graphs can be printed to provide comparative "snapshots."

Diskus is written in RPG-II with full Help support, and the package is said to allow the user to enter file description, cost center or department and application for each file and library independent of file group names.

The package can be purchased for a one-time fee of \$175, which includes source code and run book and company's "Guide to Successful Disk Management." Information Specialists is located at 2399 Devon Ave., Elk Grove Village, Ill. 60007.

Canadian Firms Targeted By Data Bases

MISSISSAUGA, Ont. — Canada Systems Group Ltd. (CSG) has introduced two new data base systems, the Canadian Federal Corporations and Directors (CFCD) file and the Calura file containing data gathered by Statistics Canada under the Corporations and Labour Unions Returns Act.

The CFCD file is said to be based on corporate filings made to Consumer and Corporate Affairs Canada by all 135,000 federally incorporated companies. It contains the name, location, details of incorporation, reported revenues, assets and earnings for the last two fiscal years as well as the names and addresses of all company directors.

The Calura file reportedly contains the names of all holding and held companies in Canada with ownership percentages in a tiered format. Both data bases are available by using CSG Text Search, a flexible keyword text retrieval system.

The cost to access each of the data bases is \$80 per connect hour, with no start-up or minimum fee. Information is available from CSG Product Sales Directorate, 90 Sparks St., Ottawa, Ont. Canada K1P 5B4.

IBM Micro Gets 'Window'

CUPERTINO, Calif. — Amber Systems has issued window-management software to serve as an applications programming tool for IBM's Personal Computer and compatible equipment.

Dubbed the VSI Window 255, the package is aimed at applications programmers developing software for IBM's micro.

The software is said to support multiple and overlapping screens on the Personal Computer. The vendor described it as a runtime software li-

brary accessible to programmers using DOS.

The Window 255 requires 11K bytes of hard disk space and works with color and monochrome boards. Assembly language, C and compiled Basic can link the software to an applications package.

Amber said Pascal and Unix interfaces will also be announced.

Priced at \$295, the package is now available from Amber Systems at 811 Alderbrook Lane, Cupertino, Calif. 95014.

Fixed Asset System Runs on IBM System/34, 36

DALLAS — Executive Technology Data Systems, Inc. has announced the availability of the Fixed Asset Accounting System for the IBM System/34 and System/36.

According to the company, the system was designed to make data entry and file maintenance easy for the non-DP user. The operator is able to input and update all data through specially formatted CRT screens. The system is said to incorporate both depreciation and Asset Cost Recovery System (ACRS) asset schedules, as

well as amortization schedules.

The company said that for the fixed asset depreciation/ACRS schedules, the system features multi-schedule on-line data entry, unlimited preliminary schedule processing and reports useful in preparing tax returns. The package is menu-driven and oriented to the accountant user.

The package is said to allow up to 999 locations per schedule, up to 99 asset classes per location and 9,999 assets per class. Reports include depreciation totals, investment credit

recapture information and basis reduction information.

The Fixed Asset Accounting System is available for \$1,500 on Sys-

tem/36 and \$1,350 on System/34. Executive Technology Data Systems is located at Suite 120, 17440 Dallas Pkwy., Dallas, Texas 75252.

Users Group Issues Mumps Primer

COLLEGE PARK, Md. — A revised primer on the Mumps programming language is available from the Mumps Users Group here.

Mumps Primer: An Introduction to the Interactive Programming Language of the Future is the second edition in-

tended to serve beginning students and programmers.

The primer is priced at \$12 for users group members and \$15 for non-members from Mumps Users Group, Suite 308, 4321 Hartwick Road, College Park, Md. 20740.

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Micro Notes

Quality Information Systems, Inc. (QIS) has announced **Qtime**, a data base management system for 16-bit microcomputers. Qtime is a fully automatic, menu-driven, multiuser software package, written in Cobol. The software runs on Microsoft, Inc.'s MS-DOS and the Unix operating system, with at least 256K bytes of memory and a hard disk.

Two versions of Qtime are available. Qtime Executive costs \$695, and Qtime Designer costs \$995 from QIS, Suite 505, Honeywell Center, 2801 Buford Highway N.E., Atlanta, Ga. 30329.

Micrographics Technology Corp. has announced an adapter module for the IBM Personal Computer and Personal Computer XT that is said to replace three IBM adapters and provide hardware interrupt logic and other graphics capabilities.

The **Mastergraphics 1 Adapter** reportedly replaces IBM's Monochrome Display and Parallel Printer Adapter, Color/Graphics Monitor Adapter and Parallel Printer Adapter. It quadruples the display storage of IBM adapters from 16K to 64K bytes, increases active colors from four to 16 and allows 640- by 200-pixel 16-color resolution and 768- by 340-pixel monochrome resolution, according to the vendor.

The adapter retails for \$579 from Micrographics at 1820 McCarthy Blvd., Milpitas, Calif. 95035.

Computalk Consultants has made available **TASSM** and **S320**, a software development package enabling Digital Research, Inc. CP/M and Apple Computer, Inc. Apple II users to develop and test software for the Texas Instruments, Inc. TMS320 digital signal processor chip.

According to a company spokesman, the package will allow CP/M and Apple II users to write, assemble and debug programs for the TMS320 in the CP/M and Apple II environments. TASSM is an absolute addressing assembler that is source-compatible with TI's AMPL assembler and EVM board. In addition, S320 provides complete interactive software simulation of TMS320.

TASSM and S320 are priced at \$190 each, with software update support available for \$50 a year. Information can be obtained from Computalk, 1730 21st St., Santa Monica, Calif. 90404.

Star Software Systems is offering **The Accounting Partner**, a new accounting system for the IBM Personal Computer.

The Accounting Partner will run on any Digital Research, Inc. CP/M, CP/M 86; Microsoft, Inc. MS-DOS; or IBM PC-DOS computer and requires a minimum 56K random-access memory, two disk drives or hard disk, a 24- by 80-char. video display with cursor addressing and a printer with 132 columns. The company said the package is the first low-cost, complete accounting system for the IBM Personal Computer marketplace.

The package, priced at \$395, includes general ledger, payroll and accounts payable and receivable. More information is available from Star Software Systems, 20600 Gramercy Place, Torrance, Calif. 90501.

Graphic Software, Inc. has announced the availability of the **Chartman** series of business graphics software for the IBM Personal Computer.

The package, which is menu- and input-form-driven, produces monochrome or multicolored horizontal and vertical bar charts, two- or three-dimensional pie charts and other presentation-quality graphics.

Chartman I and II provide high-resolution display, print charts on the IBM Personal Computer printer or Epson America, Inc. MX80 and 100 printers with Grafrax option and plot on Hewlett-Packard Co. HP 7470 two-pen and HP 7220 eight-pen plotters. Chartman III is similar to Chartman I, but offers fewer charts and graphs. Chartman IV offers intricate organizational charts, a statistical

curve-fitting feature and high-end graphics such as color bleeding.

Each module is available separately, with Chartman I priced at \$325, Chartman II at \$380, Chartman III at \$200 and Chartman IV at \$300. An enhanced module, Super Chartman II, is priced at \$425. Additional information on the Chartman series is available from Graphic Software, 1972 Massachusetts Ave., Cambridge, Mass. 02140.

Southern Computer Systems, Inc. has announced the release of the **Datalock** software package designed to provide data protection for most 8- and 16-bit microcomputers running Digital Research, Inc. CP/M or Microsoft, Inc. MS-DOS.

According to the company, Datalock provides a reliable method of protecting files so that only those who know a combination code may access the file. The combination can be any alphanumeric

string from one to 80 characters.

The package, available on 8-in. and 5¼-in. diskettes, is priced at \$95. More information is available from Southern Computer Systems, 2304 12th Ave. N., Birmingham, Ala. 35234.

Control Data Corp. has made available the **Computer Literacy Series**, a comprehensive Plato-language computer literacy curriculum for use on the Control Data 110 microcomputer and the Apple Computer, Inc. Apple IIe microcomputer.

The series consists of 22 Plato-language-based courses on topics ranging from languages to computer principles and computer applications such as data file management, word processing and spreadsheet languages.

Each course is priced at \$79.95. Information is available from Control Data, Public Relations Department, Box 0, Minneapolis, Minn. 55440.

Multilink supports as many as eight CRTs attached to serial ports on the IBM Personal Computer to create a multiuser, multitasking operating system. Compatible with IBM's PC-DOS 1.1 Release 2, the product requires one copy of DOS and approximately 24K bytes of memory overhead for a three-user system. Priced at \$199, it is available from The Software Link, Inc., 6700 23-B Roswell Road, Atlanta, Ga. 30328.

CBX86, a source file cross-reference utility for Digital Research, Inc.'s CBasic, provides cross-reference of variables and line numbers, CBasic statements, CBasic functions and string and numeric literals for systems compatible with the IBM Personal Computer and Digital Research, Inc.'s CP/M 86. A user license fee is priced at \$49.95 and is available from Systems Consultants, P.O. Box 116126, Carrollton, Texas 75011.



Micro notes

Parameter Driven Software Northwest, Inc. has introduced the **Medallion Collection**, its series of standardized software packages for use with the Convergent Technologies, Inc. microcomputer series. The Medallion Collection, developed by Timberline Systems, Inc. of Portland, Ore., consists of five accounting packages and two productivity tools designed for users with little or no computer experience. The accounting packages are payroll, accounts receivable, inventory, accounts payable and general ledger with financial reporting. Spreadsheet and Custom Reporter are the productivity tools.

The Spreadsheet package is available for \$395, and the payroll and general ledger modules are priced at \$895. The remaining modules will be available this month, the vendor said. More information can be obtained from Parameter Driven Software Northwest, 10550 S.W.

Allen Blvd., Beaverton, Ore. 97005.

Computer Editype Systems has released the **Magicbind** system for Digital Research, Inc. CP/M-based word processors, which is said to augment the capabilities of existing word processing programs. The package offers basic WP functions such as bold facing, underlining, accenting and superscripting, in addition to over 70 print formatting functions, text editing aids and file processing capabilities.

The package, written in assembly language, is priced at \$250. More information is available from Computer Editype Systems, 509 Cathedral Pkwy. 10A, New York, N.Y. 10025.

Constech, Inc. has announced the Micos I software series for construction cost management for use with any mini or microcomputer running under a Unix-

based operating system. Micos I, which is designed to assist construction managers in controlling and managing construction project costs, is said to be the first microcomputer-based cost estimating system to offer a composite data base of over 15,000 construction items, providing current and historical costs for labor, material and equipment.

The Micos I, available in January 1984, is priced at \$35,000 for both hardware and software. More information on the package can be obtained through Constech, 8615 Freeport Pkwy., P.O. Box 610663, Dallas-Ft. Worth Airport, Texas 75261.

High Technology Software Products, Inc. is touting its **Net-Works II** system as an electronic bulletin board for business and home users of the Apple Computer, Inc. Apple II and Franklin Computer Corp. Ace microcomputers. The system

lets "callers" send private mail, post and peruse public bulletins and receive programs or text files. Business users can send messages to individuals and distribute memos to local and regional offices. The Net-Works II can also be used as a message center and allows the operator to customize eight general-interest bulletin boards.

More information on the package, which is priced at \$99, is available from High Technology Software Products, P.O. Box 60406, 1611 N.W. 23rd, Oklahoma City, Okla. 73146.

Technical Analysis Corp. has announced that it will begin including a **file transfer program** as a standard feature of its Irma Personal Computer-to-IBM 3270 interface. The software will enable users with Irma installed in their IBM Personal Computer, Personal Computer XT or Personal Computer-compatible machines to transfer files between the microcomputers and mainframes through a direct, native-mode coaxial connection to 3270 controllers. The file transfer function operates under standard TSO Edit or VM/CMS Xedit modes and does not require special software on the mainframe.

The company plans to include the file transfer program in all Irma shipments in October. The Irma package is priced at \$1,195, and users who have already purchased it will be upgraded with the file transfer program at no cost, according to a company spokesman. Further information can be obtained by writing Director of Sales, Technical Analysis, 120 W. Wieuca Road N.E., Atlanta, Ga. 30042.

Miroda Software Engineering has made available a new job control/program generator for use with IBM OS and DOS-type operating systems. The general purpose **Genprep-1** application generator system is designed to produce installation-specific job streams and programs from a library of general-purpose functions and control statements. The company says the system is self-contained and requires no modification to any existing software systems.

Genprep-1 is available with a permanent license for \$3,000, including two years of maintenance and updates. Information about the system can be obtained from the Products Manager, Miroda Software Engineering, P.O. Box 10089, Chicago, Ill. 60610.

Applied Intelligence, Inc. has introduced **PC/NOS**, a networking software package designed to support microcomputers based on the Digital Research, Inc. CP/M 2.2 or Microsoft, Inc. MS-DOS 2.0 operating systems. According to the company, the package will enable an organization to connect all its microcomputers that are Zilog, Inc. Z80-based CP/M types, IBM Personal Computers or IBM-compatible, allowing them to communicate with one another and to access files anywhere on the network.

The package is available for a one-time license fee of \$100,000 plus a royalty for each workstation attached to the network. The average per-workstation royalty is said to be \$7.50. Each of the four modules may be purchased separately from Applied Intelligence, located at 2101 Landings Drive, Mountain View, Calif. 94043.

D&B Computing Services, a company of The Dun & Bradstreet Corp., has announced three micro-based support packages for the IBM Personal Computer. **Beamit**, priced at \$50, is an intelligent micro-mainframe data transfer product that formats data to the target Personal Computer; **Bee**, priced at \$50, enables Personal Computer terminals to emulate a Beehive International, Inc. DM20 terminal; and **NPL-N**, priced at \$2,000, is a nonprocedural data management package. The vendor is located at 187 Danbury Road, Wilton, Conn. 06897.

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Packet-switched networks built by BBN Communications link companies with offices around the world.

you can monitor your entire network at a glance and control it almost as easily. We'll even run the center for you if you like. And to ensure maximum network reliability—and uptime—we offer round-the-clock field service by the most experienced communications engineers in the business.

Just because we're the networking leader, don't think for a minute that we're resting on our accomplishments. Our R and D effort is one of the largest in the industry, with major programs in protocol development, network control, and future network applications. And, of course, our customers receive the full benefits of every breakthrough we make.

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Fifteen years ago, we pioneered packet-switching technology to build the Arpanet, the world's first packet-switched computer network. Today, Arpanet supports 10,000 users and over 300 different computers in the United States and Europe, and the technology we invented for it has become a cornerstone of the data communications industry.

As the networking leader, our customers include major financial, manufacturing, and industrial corporations from all over the world. Recently we've even been selected to build and run the U.S. Defense Department's major new computer network, the Defense Data Network.

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For a brochure on our complete networking capabilities, contact BBN Communications Corporation, 33 Moulton Street, Cambridge, MA 02238, (617) 497-2800.



BBN Communications Corporation

Random Notes

Sperry, Digicon Develop Seismic Processing System

HOUSTON — A seismic processing system developed jointly by Sperry Corp. and Digicon Geophysical, Inc. is available for use on the Sperry 1100 series of computers.

The Disco 1100 system handles each seismic processing function as an independent module. The user specifies the modules and the order in which they are to be applied. Output can be generated to a plotter, magnetic tape or graphics display terminal at desired points in the processing sequence, the companies explained.

Throughout the processing, the

Disco 1100 system retains critical parameters, such as depth-point geometry, velocity, statics, elevation tape numbers and processing history for every seismic line processed. This information allows the user to display and compare the effects of even small alterations in processing or parameters.

An entry-level Disco 1100 system, consisting of a Sperry 1100/70 mainframe, floating-point system array processor and plotter/controller, is priced at \$1,090,000. Larger configurations, extending up to the Sperry 1100/90 and to 16 million words of main storage, are possible. The system will be available in January through Digicon at 3701 Kirby Drive, Houston, Texas 77098.

Shipping Firms Get Tool To Handle DP Operations

MIAMI — Syscom, Inc. has placed on the market a software package intended to handle the data processing operations of shipping firms.

Known as the Shipper, the package is capable of automatic calculation of tariffs and freight charges, as well as written customer service quotations.

It runs on IBM Systems/34 and 36 and reportedly will be available for other hardware in the future.

Price of the package is \$18,000. It is now available from Syscom at 10300 Sunset Drive, Miami, Fla. 33173.

Point 4 Offers Course Series On Iris Structures, Formats

IRVINE, Calif. — Point 4 Data Corp. has introduced the Iris File Clinic, an eight-hour course package providing instruction and information on the internal data structures and formats of all types of Iris files.

The package on audio cassette tape is supported by documentation including reference manuals and course workbook and is designed to enable more efficient use of the Iris system in multiuser time-sharing and multitask processing environments, the vendor said.

The price is \$250 through December, and the course is available from Point 4 Data Corp., 2569 McCabe Way, Irvine, Calif. 92714.

Ticker Service Offers Users Market Stats

NEW YORK — The Monchik-Weber Corp., which specializes in information services for the financial community, has added several features to its formatted real-time ticker service.

The real-time service, which provides subscribers with continuous transmission of updated information on stocks, options, financial futures and options on futures and indexes, now includes data on market statistics and indexes as well as two additional pricing features.

Subscribers can now receive market statistics such as up, down and net tick; number of issues traded; and trade volume and dollar volume for major stock and option exchanges. In addition, as exchanges begin reporting and trading new indexes, the Monchik-Weber service will process and transmit that data, including calculations for the major indexes themselves and updated prices, the company said.

Two Pricing Products

Two pricing products have also been added by Monchik-Weber. The custom-generated ticker is a selective ticker whose parameters are defined by the user. This ticker allows users to receive pricing information on preselected issues. This selection can be made on the basis of exchange, issue type and individual ticker symbol.

The 20-min delayed ticker, which runs on 9,600 bit/sec lines, is designed for companies that distribute pricing information to individual investors. It offers data that is consistently 20 min behind market prices, the company said.

Prices for the Monchik-Weber formatted real-time ticker service range from \$1,200/mo to \$4,000/mo, depending on the number of features selected, according to a spokesman for the vendor. The custom-generated ticker costs \$5,000 for the initial setup, plus an additional \$500/mo.

More information can be obtained from Monchik-Weber, which is located at 11 Broadway, New York, N.Y. 10004.



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Compatible With Ethernet, SNA

Intelligent Net Interface Unit Unveiled

SANTA CLARA, Calif. — Ungermann-Bass, Inc. has announced the Net/One Personal Connection, an intelligent network interface unit (NIU), which is compatible with Xerox Corp.'s Ethernet local-area network and IBM's Systems Network Architecture (SNA).

The Net/One Personal Connection can be used with microcomputers manufactured by IBM and Texas Instruments, Inc.

and is an extension of the firm's Net/One local-area network. The Net/One Personal Connection allows users to share information and resources and integrate them with other corporate resources, such as an IBM host processor, using IBM's SNA.

The Net/One Personal Connection is based on the Personal NIU, a plug-in board that reportedly extends the range of the firm's Net/One and handles all the

communications tasks that can consume a large percentage of the host CPU's resources.

Microcomputers configured with the Personal NIU can run any applications programs under Microsoft, Inc.'s MS-DOS operating system without modification. In addition, applications can be shared across the network, the vendor said.

The Net/One Personal Connection features SNA gateways, which allow users to access mainframe-based application programs. The SNA gateways are equipped with emulation software that enables microcomputers to appear as IBM 3274 controllers, 3278 printers or 3287 printers.

Available in January 1984, the Personal NIU will cost \$850, including MS-DOS networking commands on a 5¼-in. diskette. Print server and disk server software packages, called Printshare and Diskshare, will cost \$500 each, the vendor said. Ungermann-Bass is located at 2560 Mission College Blvd., Santa Clara, Calif. 95050.

Proper RFP Preparation Critical To PBX Telephone System Purchase

By Jim Bartimo
CW Staff

SAN DIEGO — When purchasing a private branch exchange (PBX) telephone system, it is absolutely essential to prepare a request for proposal (RFP) properly. But many telecommunications managers do not submit to vendors the type of RFP that will get them the system they need, according to James R. Gordon of the Nashville, Tenn., consulting firm, TCS Communications Consultants.

Gordon laid down some guidelines for preparing an RFP in the purchase of a PBX at the Tele-Communications Association annual meeting held here recently. "You need to organize the purchasing process," he said, "even if you end up buying a system on gut feelings."

The real reason for sending out RFPs is to create consistency in decision making at the installation site, to assess organizational needs, to become part of the corporate planning process and to score political points, Gordon said.

"A lot of telecommunications managers complain that they're not involved in company goals," Gordon said. "The preparation of an RFP allows you to go and talk to people about what they need. We don't just live in a purely technical world — we also live in a political world."

Before the RFP is even drawn up, a needs analysis must be conducted. This process should investigate the present

situation, short and long-term needs, specialized department needs and call traffic growth.

"From the time you begin work on the RFP to the time you install your system is going to be about two years," Gordon said. "Don't expect your system to reflect the RFP exactly unless your company is completely stagnant in those two years."

Preparing an RFP is essentially giving vendors instructions on how to present their products. The RFP itself should ask for information on such PBX options as automatic route selection, call detail recording, the cable plan and the traffic pattern, Gordon said. The RFP also should ask specifically about system architecture, the system schematic, the equipment room and system management. It should ask for detailed procedures, a completion date and a training plan.

Once the RFP is sent out and vendors start to respond, they should be called in to a "preproposal, one-on-one" meeting. The manager should work with the vendors in meeting the specifications of the RFP before meeting with a vendor a second time to hear its bid.

Once all the bids are in and a vendor is selected, contract negotiations begin, and the installation is planned. "The two biggest reasons for a PBX failing in an organization is that the contract wasn't negotiated correctly or the installation wasn't planned well," Gordon said.

IBM Compatibility For DCA Nets Added With Tools

NORCROSS, Ga. — Digital Communications Associates, Inc. (DCA) has added two IBM-compatible communications packages to its Integrated Network Architecture (INA).

The Binary Synchronous Communications Transport System (INA/BTS) transports synchronous data formatted under the IBM 3270 Binary Synchronous Communications (BSC) protocol. Features include host selection in a binary synchronous environment, transmission of both 3270 synchronous and asynchronous data through the same telephone line, elimination of poll/response through the network and more efficient satellite links, the vendor said.

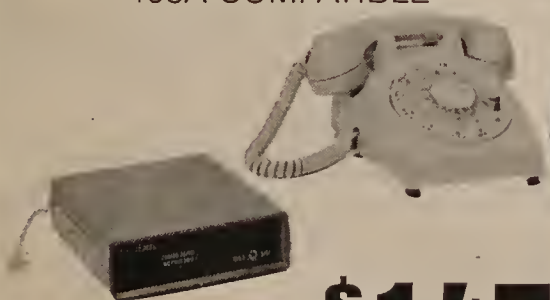
INA/BTS supports remotely attached 3270 control units and their associated displays, keyboards, printers and ancillary devices. Each INA/BTS unit manages either one or two synchronous communications links using the 3270 BSC protocol.

(Continued on Page 66)

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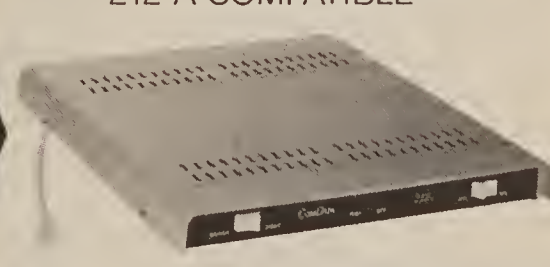
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Reduced by \$100

Price Cut on Freedom 100 Terminal

SAN FRANCISCO — Liberty Electronics Co. has announced a \$100 price reduction on its Freedom 100 video display terminal, from \$595 to \$495.

According to a vendor spokesman, the pricing move was made in response to some economies of scale in manufacturing.

The Freedom 100, first shipped in September 1982, features a 12-in. green phosphor display with a 24-line by 80-col. data display and a 25th status line, 7- by 9-dot matrix characters with descenders, 128 Ascii characters, 15 graphics characters and a five-position tilt screen.

Emulation modes for the Televideo Systems, Inc. Televideo 910, Hazeltine Corp. 1420, Applied Digital Data Systems, Inc. Regent 25 and Lear Siegler, Inc. ADM 3A/5 are standard on the Freedom 10, a spokesman said.

Price breaks for volume orders are 10 to 24 terminals for \$470 each; 25 to 99 terminals, \$445; 100 or more terminals, \$420.

Display Station Fits IBM 3270

MILPITAS, Calif. — The Braegen Corp. has introduced the Model 8521 display station compatible with the IBM 3270 system.

The 8521 has a small footprint and low-profile keyboard, a 15-in. screen which displays 24 lines by 80 characters and a 25th status line.

The 8521 display features Braegen's Softkey security system, which allows managers to assign a keyword or code for access to each terminal in environments where security is a concern.

The cost is \$1,700 from The Braegen Corp., 525 Los Coches St., Milpitas, Calif. 95035.

The Freedom 100 comes with a six-month limited warranty. Extended warranties are available, according to the vendor.

Additional information is available from Liberty Electronics, 100 Clement St., San Francisco, Calif. 94118.

Systems Consultants Links IBM Micro, Datapoint Mini

CARROLLTON, Texas — Systems Consultants, Inc., a five-year-old consulting firm specializing in mini and microcomputer systems, has announced its first personal computer-minicomputer communications link software.

The software reportedly links the IBM Personal Computer to any Datapoint Corp. minicomputer host system.

The software package, called PC/Link, allows the Personal Computer user to use the system as a Datapoint 8200 CRT workstation and provides a path for data file transfer between the host Datapoint system and the user's Personal Computer system disks.

According to the vendor, the PC/Link software is designed for simplicity of use and allows configuration to meet each Personal Computer user's communications requirements. Also included in the software

is a "log file" feature and security protection; both features aid in data file movement management and control.

The PC/Link, available immediately, is priced at a one-time-use license fee of \$2,500 per Datapoint network. The package includes one Datapoint resident host module and unlimited copies of the Personal Computer module, subject to the terms of the software license, plus one copy of the Personal Computer user's guide.

The PC/Link is the first in a series of personal-minicomputer communications products planned. The next package will be software with the same features and data communications capabilities for use on Apple Computer, Inc. Apple II and Apple IIe personal computer systems. More information is available from Systems Consultants through P.O. Box 116126, Carrollton, Texas 75011.

Communications Packages Boast IBM Compatibility

(Continued from Page 65)

Each of the INA/BTS links may operate at speeds up to 9.6K bit/sec with a maximum aggregate speed of 19.2K bit/sec. Each link connects the INA network either to an IBM host communications control unit or to an IBM 3270 terminal.

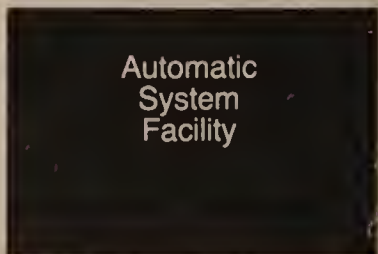
The Asynchronous Terminal Controller (INA/ATC) allows asynchronous Ascii terminals to communicate with an IBM or compatible processor using 3270 BSC or Systems Network Architecture (SNA) protocols. The Ascii terminals can be connected directly to the DCA network, or they can operate remotely.

INA/ATC features include: asynchronous terminal access to IBM application software normally requiring a 3270 terminal, an interface for up to 24 asynchronous terminals connected to a host processor over a synchronous line operating at up to 9,600 bit/sec and the ability to have terminals geographically dispersed.

Other features include the ability to designate any number of ports as IBM 3287-style printers and support for a local copy feature, which allows the buffer of one device to be copied into the buffer of any other device attached to the INA/ATC.

The INA/BTS costs from \$995, and the INA/ATC from \$8,950, the vendor said from 303 Technology Park, Norcross, Ga. 30092.

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| Champaign, IL | October 12 |
| Chicago/Oakbrook, IL | October 13 |
| Columbus, GA | October 12 |
| Denver, CO | October 11 |
| Edmonton, ALTA | October 13 |
| Halifax, NS | October 13 |
| Huntsville, AL | October 12 |
| Jackson, MS | October 13 |
| Little Rock, AK | October 14 |
| Moncton, NB | October 12 |
| New York, NY | October 12 |
| Phoenix, AZ | October 12 |
| Portland, ME | October 12 |
| Raleigh, NC | October 13 |
| Richmond, VA | October 11 |
| Roanoke, VA | October 12 |
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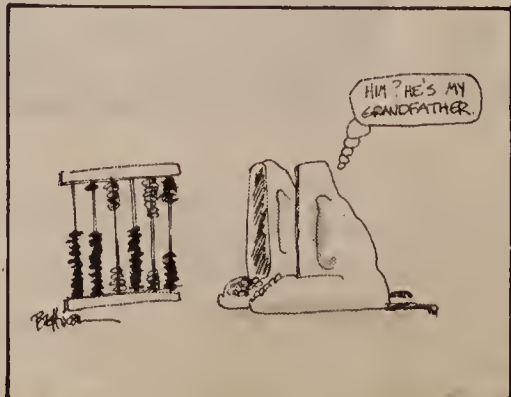
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5.
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The System

1.
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Raytheon Unveils 3270-Compatible Products

BOSTON — A product line of IBM 3270-compatible displays, printers and control units was announced here recently by Raytheon Data Systems Co.

The PTS-1000/4000 products introduced include three interactive displays, three control units and five printers.

The product line is the result of two years of research and development, according to a company spokesman, who said further announcements are scheduled during the next 12 months as the company "aggressively" pursues the IBM 3270 and office automation markets. The vendor stressed the application of ergonomics in the design of the products and the electric typewriter-size

footprint of the terminals.

The three displays are Intel Corp. 8085 microprocessor-based with 24K bytes of read-only memory. A 12-in. diagonal monochrome terminal, the R1078-X, has 48K bytes of random-access memory (RAM) and is said to be compatible with the IBM 3178 and 3278-2 display terminals; the 15-in. R4078-X monochrome terminal, compatible with the IBM 3278, and the 13-in. R4079 color terminal, compatible with the IBM 3279-2A and 3279-3A models, both have 64K bytes of RAM.

A display terminal/control unit, designated R1076, is said to be compatible with the IBM 3276 control unit and IBM 3178 display terminal and supports up to seven display and

printer terminals using IBM 3276 communications protocol. The R1074 large cluster control unit supports as many as 32 display and printer terminals using IBM 3274 communications protocol. The R4074 supports both 3276 and 3274 protocols with a dedicated line or channel communications attachment and is said to offer additional capabilities including local format storage, extended memory, increased communication speeds and local channel attachment.

Printer support includes an R4185 screen printer, R4187 matrix printer, R4189 line printer and R4188 correspondence printer. All system components reportedly offer three coaxial cabling options — star, multidrop and coaxial multiplexing — operat-

ing in IBM's Binary Synchronous Communications and Systems Network Architecture environments as well as airline link control environments.

The systems are available for purchase, and short-term leases of one, two or three years are offered. A typical small cluster remote system, with four displays and one 150 char./sec matrix printer, is priced from \$13,170.

The vendor is located at 1415 Boston-Providence Tnpk., Norwood, Mass. 02062.

H & A Package Guards Remote, Central Series/1

SAN FRANCISCO — H & A Computer Products, Inc. has announced the release of a communications package for the IBM Remote Series/1 Series (RSS), which protects the remote as well as the central Series/1 from unauthorized access.

The new package allows a centralized Series/1 to access any number of remote Series/1s and, via menu selection, transfer programs and data files or execute programs on the remote Series/1 from a terminal of the central Series/1.

According to the vendor, bit strings transmitted over the communications line are different each time a password is used, foiling any effort to decipher and use them to gain unauthorized access to a Series/1.

RSS runs with IBM's EDX operating system and is available for \$3,500, the vendor said. More information is available from H & A Computer Products, Inc., Suite 204, 30 Hoteling Place, San Francisco, Calif. 94111.

Cosystem Fits Micros Using MS-DOS System

SUNNYVALE, Calif. — Cygnet Technologies, Inc. has announced the Cosystem, a microprocessor-based voice and data communications system for users of IBM's Personal Computer or other microcomputers using Microsoft, Inc.'s MS-DOS operating system.

The Cosystem can function both independently and synergistically with microcomputers using MS-DOS. The unit features simultaneous voice and data desk-to-desk teleconferencing over normal telephone lines. The unit can also be used to send and receive electronic mail and to perform intelligent telephone features such as speed-dial, last number and automatic redial from an extended directory. Also included are programmable function keys and automated private branch exchange calling functions, the vendor said.

The Cosystem with a 300 bit/sec modem costs \$1,495. A 1,200 bit/sec modem version of the Cosystem costs \$1,845, the vendor said from 1296 Lawrence Station Road, Sunnyvale, Calif. 94089.

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With Graphics Terminal, Display Station

Envision Beefs Up Color Terminal Product Line

SAN JOSE, Calif. — Envision Corp. has added a text/graphics terminal and a graphics display station to its line of color terminal products.

The Envision 215 color text/graphics terminal, designed for busi-

ness and scientific applications, is a 13-in. terminal with color graphics and alphanumeric capabilities. It has 640-by-409 pixel resolution and can display eight colors from a palette of 64. Compatible with Digital Equip-

ment Corp.'s VT100, the Envision 215 has a 16K-by-16K address space and graphics drawing primitives for vectors, complex polygons and graphics characters.

The Envision 239 color graphics display station, with a 19-in. screen, local graphics processing capabilities and high-resolution color display, is designed for use in tabletop or rack-mount configurations for computer-aided design and manufacturing, engineering and process control applications, the company said. It features user-definable symbols, hardware zoom and pan, local display list processing and a 4,096-color palette from which 16 colors can be

displayed simultaneously. The 239 is compatible with the DEC VT100 and the Tektronix, Inc. 4105.

Options for both products include a graphics tablet or mouse and an RS-170 interface for large-screen projection systems or photographic hard-copy systems. In addition, both terminals are compatible with the Envision 430 vector printer.

The Envision 215 is available now for an introductory price of \$2,990. After November, it will be priced at \$3,450. The Envision 239, which will be available in October, costs \$9,450 in single quantities. Envision is located at 631 River Oaks Pkwy., San Jose, Calif. 95134.

Communications Processor Features Terminal Emulation

MIAMI — Innovative Electronics, Inc. recently announced a communications processor said to convert a Digital Equipment Corp. VT100-compatible terminal into a full-function IBM 3277-1, 3277-2, 3278-1 or 3278-2 terminal communicating with an IBM host using the Ebcidic binary synchronous communications protocol.

The MC-80/600-1 communications processor reportedly emulates an IBM 3274-51C communications controller. It performs full screen mapping, and data displayed on the asynchronous Ascii terminal will be the same as that which appears on an IBM 3277/3278-type terminal, with virtual screen sizes of 480, 960 and 1,920 char., according to a spokesman for the vendor.

The product is said to include extensive on- and off-line diagnostics; diagnostics are provided through a seven-segment display.

Product Allows Password Safety From Modem

SANTA CLARA, Calif. — Ven-Tel, Inc. has introduced a product that allows password security from the modem itself.

Called the 212 Security Plus, it provides two levels of password security — one for the operator and the other for the supervisor. No call can be made without one of the passwords.

The operator password permits the user to see only the name assigned to the nine destinations stored in the modem's battery back-up memory. The supervisory password is necessary for the user to examine, modify or delete any of the telephone numbers, passwords, account numbers or other information stored in the modem, according to a spokesman for Ven-Tel.

Greater security is also possible by using the Security Plus command structure. In addition to hiding passwords, parts of passwords may be required, callback requests may be embedded, cross-check responses provided and other sophisticated security routines incorporated into the logon procedure.

The modem also provides an integral activity timer that resets the modem after five minutes of system inactivity.

The 212 Security Plus is priced at \$675. Further information is available from Ven-Tel, which is located at 2342 Walsh Ave., Santa Clara, Calif. 95051.

Base price for the unit is \$1,495. Further information is available from Innovative Electronics, which is located at 4714 N.W. 165th St., Miami, Fla. 33014.

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end-to-end management. And, if a problem ever does arise anywhere in the network, you just call us. That's single vendor simplicity.

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System for Voice, Data Management Unveiled

DALLAS — Stonehouse & Co. has introduced a software system for voice and data telecommunications management.

Management of Network Income, Expense and Service (Monies) was developed for the Wells Fargo Bank of San Francisco.

The system runs on standard IBM mainframe computers under IBM's CICS and reportedly requires no special computer systems, software experts or special terminals.

It is written in Ansi-standard Cobol using command-level CICS. Coding techniques follow standard industry practice and file organization.

Monies includes menu-driven screens, on-line file maintenance, on-line reporting, system modularity

and independence, an automatic built-in access security system and complete file backup and restore procedures.

The major areas of communications affected are the following:

- Order entry — automates the placing and tracking of orders for equipment and services by using a central catalog.

- Inventory — allows the communications manager to know exactly what telephone, data and computer equipment is in stock, through queries by a variety of classifications.

- Billing — automation of the billing process, giving the manager an accurate way of reconciling vendor invoices to actual equipment and service usage.

- Corporate information directory — a way to keep track of personnel, their office locations and telephone numbers.

- Network analysis — a module that reads the call history data and provides summaries of network usage by switch and trunk group.

- Availability management — a network control center application

that automates the handling and reporting of the diagnosis, dispatching and problem-resolution functions on voice and data networks.

Monies modules range from \$35,000 to \$250,000. The system is also available on a lease basis. More information is available from Stonehouse at Suite 400, 4100 Spring Valley, Dallas, Texas 75234.

ID Systems Offers Family Of Graphics Terminals

HILLIARD, Ohio — ID Systems Corp. has announced a family of ultra high-resolution graphics terminals

said to offer dual-display architecture and high speed. Resolution is 1,280 by 480 pixels on a 14-in. screen.

The ID-200 family is reportedly being offered at a cost competitive with low-resolution graphics terminals now being marketed. It is also said to be the first terminal to perform both polygon-fill and seed-fill with fill-until and fill-while algorithms.

Features include NTSC compatibility, 16 levels of zoom, instantaneous hardware pan, display of up to eight windows simultaneously, a palette of eight to 16 colors, 10⁷⁷ user-selectable graphics pattern elements, 128 downloadable fonts that allow users to create their own characters, display list memory and a display writing rate of up to 1.24 million pixel/sec.

Prices for the ID-200 family start at \$3,800. ID Systems is located at 4089 Leap Road, Hilliard, Ohio 43026.

Four Terminals Boast Graphics, Ergonomics

CAMBRIDGE, Mass. — Westward Technology, Inc. has announced four graphics terminals that are reportedly ergonomically designed.

The 1015 was designed for applications where a high-resolution display is not critical. With a 640 by 490-pixel resolution, the 15-in. monochrome display of the 1015 is suited for educational, numerical control and business graphics applications. The unit is compatible with Tektronix, Inc. 4010 and 4012 series terminals. The unit also has Digital Equipment Corp. terminal compatibility. The 1015 costs from \$3,250, the vendor said.

The 2015 has a 15-in. desktop display, and the 2019W is a 19-in. workstation. The units were developed for engineering, architectural or finite element analysis applications. The units feature a 1,024 by 784-pixel resolution, and both terminals feature a scrolling multipage text memory. Options for the 2015 or 2019W include a high-speed vector generator and a range of local graphics commands. The 2015 costs from \$6,250, and the 2019W costs \$10,950.

The 2014C 14-in. color terminal features 16 displayable colors from a palette of 4,096 colors. The unit costs from \$5,760 from 5 Cambridge Center, Cambridge, Mass. 02142.

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| ZIP | _____ |
| Protocols currently used: (including lookalikes) | |
| <input type="checkbox"/> IBM 3270 | <input type="checkbox"/> SDLC |
| <input type="checkbox"/> Burroughs Poll/Select | |
| <input type="checkbox"/> X.25 | <input type="checkbox"/> Other _____ |
| Number of remote locations _____ | |
| Geographic Scope | |
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Elcom Systems Offers Commcard

Single-Card Communication Out

CORONA, Calif. — Elcom Systems Peripherals, Inc. has introduced its ESP Datanet-comm Communications Cards (Commcards) said to incorporate IBM 2480 and 3780 communications controllers, IBM 3270 Binary Synchronous Communications and asynchronous RS-232C communications into one card.

The Apple Computer, Inc. Apple II, Apple II+, and Ap-

ple IIe microcomputers reportedly can communicate with any mainframe, mini-computer or microcomputer using the protocols. The cards are also said to support transmissions based from floppy disks, hard disks and local-area networks.

The cards contain their own Zilog, Inc. Z80 microprocessor, I/O control, erasable programmable read-

only memory and random-access memory. The ESP Commcard II for the Apple II is priced at \$995, and the ESP Commcard III for the Apple II is priced at \$1,195. Elcom Systems Peripherals is located at Suite A, 439 Harrison St., Corona, Calif. 91720.

Defender II Safeguards Data Bases

PALO ALTO, Calif. — Digital Pathways, Inc., manufacturer of microprocessor-based communications systems, has introduced the Defender II, its next generation dial-up system for computer-access control and management.

Defender II guards against unauthorized data base entry by providing an automated dial-in, call-back procedure allowing access only through authorized telephones.

It also provides a variety of management, diagnostic and network control features, including an audit trail of all transactions, least-cost telephone routing, prioritized queuing, status reporting and preventive diagnostic procedures.

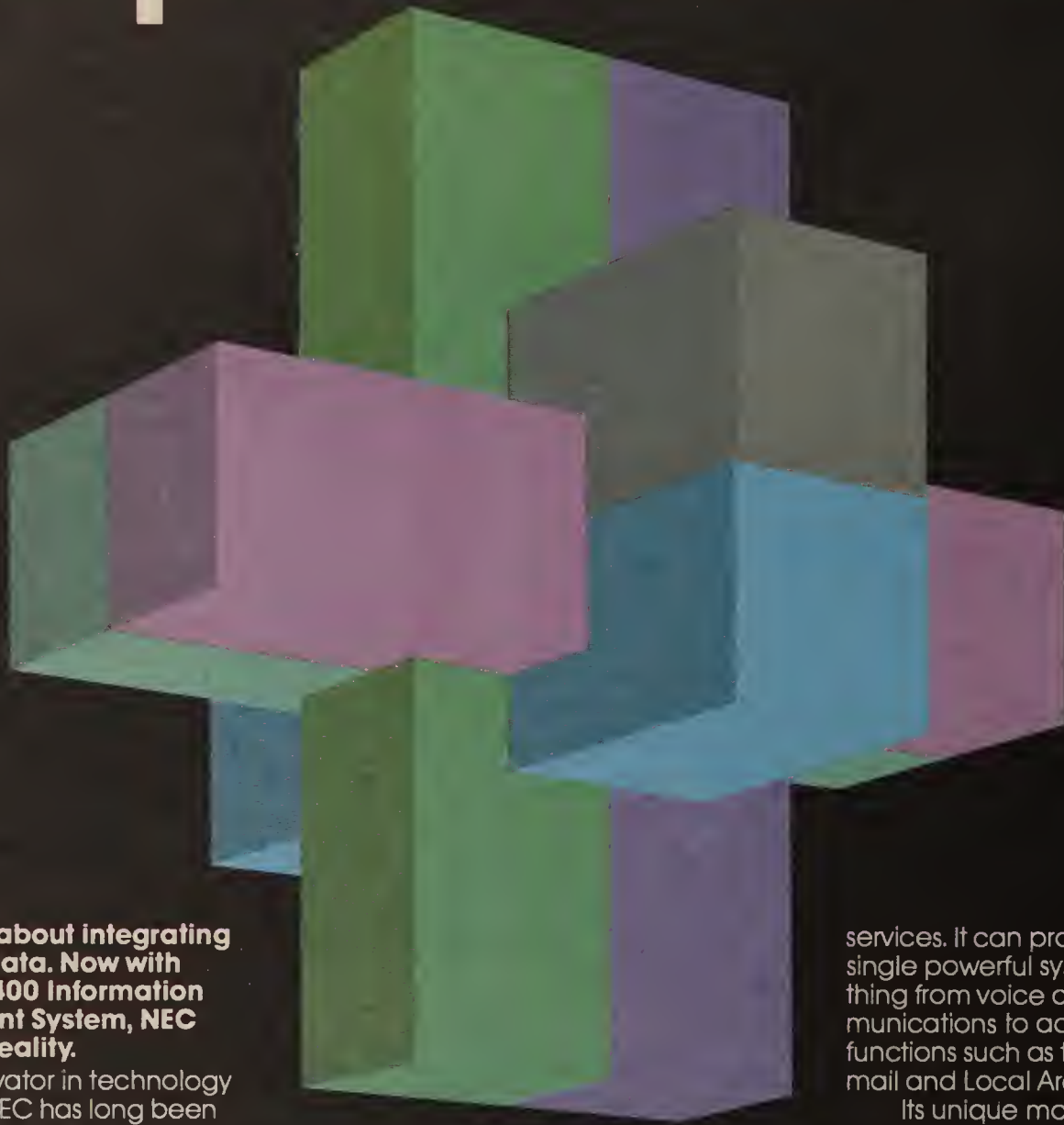
Defender II design is based on Digital Pathways' proprietary bus-controlled 212A modems. Up to 48 of the modems are packaged in each 19-in.-high rack-mounted cabinet with Intel Corp. multibus modularity. Connection between the telephone system and computer ports requires no software modification. Up to 16 independent computer dial-up facilities can be included in one Defender II installation.

A user has the option of accessing Defender II by using a Touch-Tone telephone or a conventional keyboard.

When it is determined that the identification number is valid (three false tries activate an alarm), the system retrieves the user's access parameters from its battery-supported memory. The parameters include which computers may be accessed, phone number, baud rate, priority, user classification and account number.

The basic Defender II can support more than 1,000 users with virtually unlimited expandability through the use of additional memory boards. A typical 48-modem system costs about \$800/line, field-installed. Adapters are available for other modems at \$200/line. More information is available from Digital Pathways at 1060 E. Meadows Circle, Palo Alto, Calif. 94303.

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Unlike costly patchwork solutions to office automation, NEAX 2400 IMS is a modular system designed from its inception to economically integrate divergent

services. It can provide as a single powerful system everything from voice and data communications to advanced functions such as text and voice mail and Local Area Network.

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unprecedented 184 ports to over 20,000. You can start with voice communications, then add data and special services as needed, by adding compact modules.

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VOICE AND DATA

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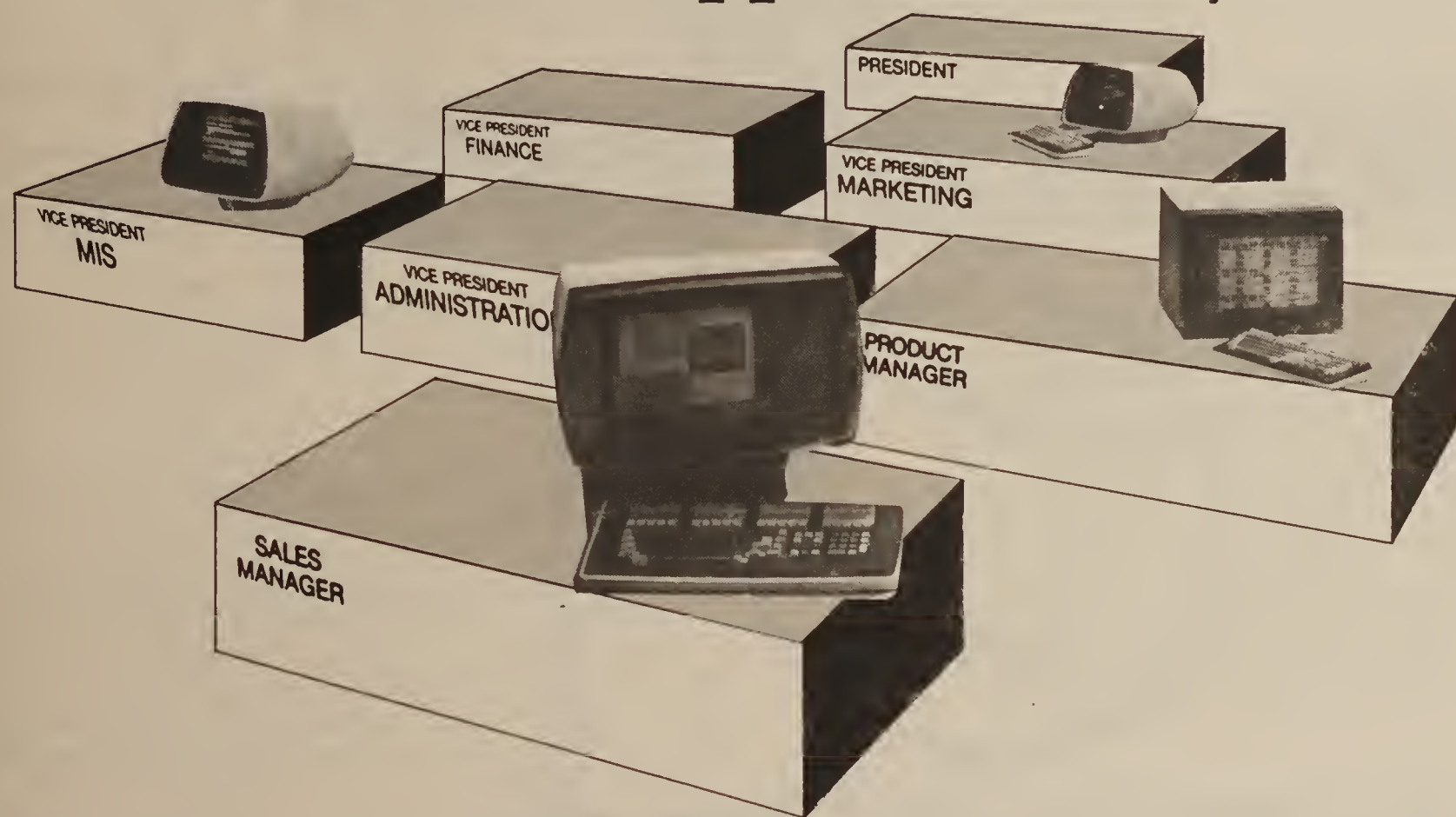
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Analyzer, Recorder Added To Atlantic's Test Gear

ALEXANDRIA, Va. — Atlantic Research Corp. has added the Interview 3600 Protocol Analyzer and Selective Data Recorder and the Interview 4600 Protocol Analyzer and Interactive Test System to the company's line of data communication test equipment.

Both products reportedly feature Ansi X.25 menu-driven capability, allowing the user to select frame and packet by name for analysis or for test message generation.

Standard features on the 4600 (and optional for the 3600) include the remote transfer of test and data samples, storage of up to 100 tests on a cartridge and menu-designed rules

for protocol development.

The 3600 is priced at \$11,000, and the 4600 costs \$16,000. More information is available from the vendor at 5390 Cherokee Ave., Alexandria, Va., 22314.

IBM Micro Linked to Honeywell

ORANGE, Calif. — Insurance Technology Consultants (ITC) has announced the Asynchronous Communications Emulator (ACE), an IBM Personal Computer-to-Honeywell, Inc. network communications link.

According to the vendor, the software allows IBM's Personal Computer or Personal Computer XT to be

Terminal Fits DEC VT100

TEWKSBURY, Mass. — Visual Technology, Inc. has announced a display terminal said to be compatible with Digital Equipment Corp.'s VT100 and VT102. Also, the terminal can support Tektronix, Inc. 4010/4014-compatible graphics by the addition of a graphics card that plugs directly into the main printed-circuit

board, the vendor said.

Standard features on the display terminal include all VT100 and VT102 basic features, a 14-in. P31 (green) phosphor screen, tilt/swivel display, low-profile (DIN standard) keyboard and eight (shift 16) programmable function keys stored in nonvolatile memory.

The graphics option card reportedly provides 768- by 293-pixel resolution on a 50Hz/60Hz noninterlaced display.

Various printers, plotters and digitizers are supported via the RS-232C buffered auxiliary port. The list price for the Visual 102 is \$1,095; the graphics option card costs \$895. Visual Technology is located at 540 Main St., Tewksbury, Mass. 01876.

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Entry Station Announced For IBM Micro

RALEIGH, N.C. — Barr Systems, Inc. has introduced Barr/Hasp, a remote job entry station for the IBM Personal Computer.

Barr/Hasp provides access to large computers using established languages and simultaneously transmits and receives straight into IBM's MVS/Job Entry Subsystem 2 and 3 and VM/Remote Spooling Communications Subsystem, bypassing the Time Sharing Option and Conversational Monitoring System, the vendor said.

The package includes a synchronous communications adapter board, software and a user's guide. The software is menu-driven. The hardware supports interrupt-driven I/O for IBM's Binary Synchronous Communications, Synchronous Data Link Control and Ansi X.25 protocols in both full- and half-duplex modes.

Barr/Hasp requires 64K bytes of memory, IBM's PC/DOS operating system, 80-col. screen display and one diskette drive.

The package is available for \$750 from Barr Systems, Suite 315, 2500 Blue Ridge Road, Raleigh, N.C. 27607.

Tape Subsystems Aid Data Users

WINCHESTER, Mass. — Blackhole Technology, Inc. has recently announced a line of magnetic tape subsystems said to provide data collection users with the necessary tools to meet their communication requirements.

The RS-232F Communication Interface subsystems feature hardware- and software-selectable parameters, support for translation mode and variable write block sizes.

The rack-mountable cabinets reportedly support either single-density or double-density drives and are said to have the capacity to receive data while writing to the tape drive and to transmit data while reading from the tape drive.

Prices start at \$2,495, and delivery is 30 to 45 days, the vendor said.

Blackhole Technology is located at 225 East St., Winchester, Mass. 01890.

Locking Up The Mainframe

*'Band-Aid' security
can't patch up
vulnerable systems.*

By Robert P. Campbell

The highly publicized system penetrations and abuses this summer raise unsettling questions about computer security. Were these sensitive systems that failed to use available security tools and techniques . . . or well-defended systems that fell prey to sophisticated attack?

While there is a tendency to write off these incidents as part of the "high-tech rite of passage" for bright kids with computers (akin to "hot wiring" autos a few generations ago), there are longer term concerns. For how long can patchwork security inspired by an emergency safeguard a system? When will vendors build in sufficient architectural controls?

No matter how the questions are answered, computer security continues to be basically a management problem. And data processing management will surely spend a great deal of time assessing recent events for its corporate management and users.

Most organizations do not recognize that very few systems are *not* sensitive or critical. As a result, they do not have a comprehensive security policy with which to define the sensitivity of their information or the critical nature of their processing. Potential business impact or harm to people served by and dependent upon the system is not adequately analyzed.

Lacking this understanding, most organizations fail to apply currently available physical and logical security controls to their sensitive and critical systems. If applied, they are often

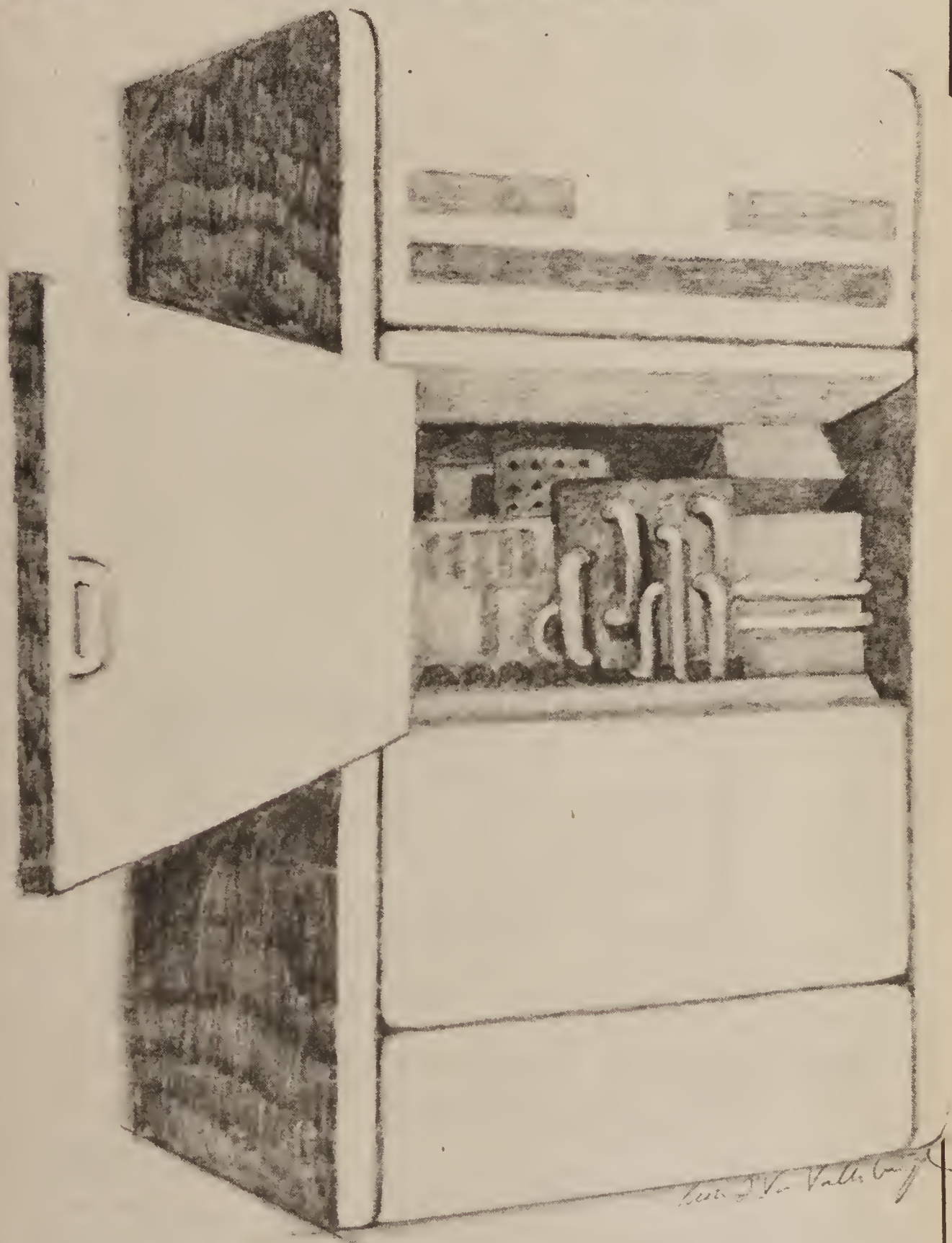
incompletely implemented, poorly monitored or improperly managed.

Much security is based upon an implied ignorance of the technology on the part of everyone except the system "operators" who have privileged access. Users are expected not to have this knowledge. But the spread of personal computing is developing a level of computer literacy in the general public that renders ignorance an invalid defense.

This computer literacy has dramatically altered the nature of the threat. No longer composed of a few well-

informed and improperly motivated individuals, the group of potential abusers has expanded tremendously.

Most system architectures considered "untrustworthy" for Department of Defense (DOD) purposes have security gaps that could be exploited by both outsiders and insiders. Computers have been designed to operate in a "friendly" or benign environment. The technology of system security is moving slowly from the needs of a batch environment to those of on-line, real-time operations and fully networked environments. Many



IN DEPTH

patches, add-ons and "Band-Aids" are being used to enhance security, but there is still a long way to go before systems can effectively distribute and integrate security control across a networked environment.

Physical security for systems is still much needed. Overall logical security is such that we still cannot — or prudently *should* not — put terminals in "hostile" or unprotected environments except under highly restricted circumstances (for example, a limited-function automated teller machine or a restricted data entry device, such as a credit card reader).

The need for physical or environmental security is draining resources and inhibiting application of the technology. At the same time, we are taking unwarranted risks as sensitive and critical systems proliferate.

Early Efforts

Unfortunately, the potential for our current security problems has been known for years. We are watching a predicted scenario play itself out.

Concerns about potential security problems had their basis in the late 1950s and early '60s. Some of the earliest organized efforts to deal with

The potential for our current security problems has been known for years. We are watching a predicted scenario play itself out.

security problems were those of the federal government. The DOD had long since recognized the need for physical security and in the late '60s began focusing on system security problems with a project called "Adept-50," which attempted to enhance security on the IBM 360.

At the same time, a Defense Science Board task force was chartered to study and recommend appropriate computer security safeguards that would protect classified information in a multiaccess, resource-sharing computer system. The task force report, "Security Controls for Computer Systems," now commonly referred to as the Rand or Ware Report is considered to be a classic work and still valid today.

In the early '70s, DOD conducted studies of existing computer architectures and identified "generic" flaws in them. Armed with this knowledge, DOD set out to enhance

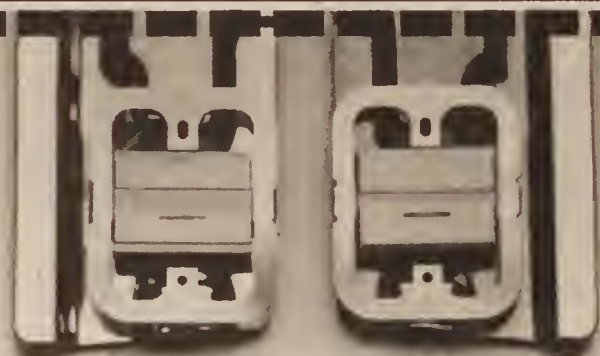
the security features of the Honeywell, Inc. Gcos operating system, then being used as the backbone of its command and control network. This effort not only produced the enhanced Honeywell Multics operating system, which was quickly subverted by a penetration effort conducted by the Air Force, but it also confirmed the growing belief that security retrofit — the "Band-Aid" approach — is costly, short-sighted and largely ineffective.

Realizing that security had to be engineered into systems as a primary design objective, DOD focused its research and development activities on building more secure systems from scratch. DOD concentrated on defining security policy-based specifications and using formal development methodologies that could form the basis for later development of more secure or trustworthy computer systems.

Realizing that it could not undertake the development of this technology by itself, the DOD embarked in the late '70s upon its Computer Security Initiative, intended to transfer to business and the computer manufacturers that which it had learned about secure systems technology.

Through the DOD-sponsored Computer Security Technical Consortium, vendors and manufacturers of computers were invited to use these materials and also to submit documentation on the architectural design of their equipment for evaluation in accordance with DOD design criteria. Most architectures are currently considered by DOD to be "untrustworthy" in terms of their ability to safeguard sensitive information in a multiaccess, resource-sharing computing environment. In 1981, the DOD Computer Security Center was established to extend this initiative, evaluate security enhancements and promote transfer of secure systems technology into industry.

Throughout this cycle, DOD's security needs have been viewed as unique to its operations and of little commercial value to the private sector. An actual or at least perceived lack of demand and, therefore,



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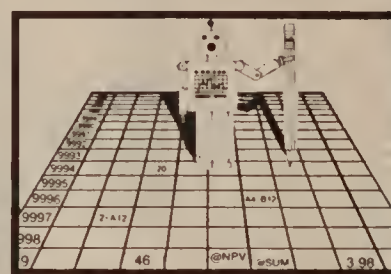
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of economic viability for security-enriched products in the private sector has seriously hampered development of this technology.

Therefore, high-security defense systems have had to achieve much of their security through isolation and dedication, a practice not economically viable in the commercial environment. Many of the operational modes and configurations being used in the commercial sector would not be acceptable to the Department of Defense. In light of what we are now seeing, it is timely to ask if these system security and integrity needs are truly unique to "special" DOD requirements or whether they apply to the commercial sector as well.

On the commercial side, security efforts have been less farsighted, generally focusing upon specific corrections to short-term problems and manifesting themselves in such popular products as physical access control devices, systems access control packages, audit software and evaluation techniques, telecommunications intercept/call-back devices and the like.

Occasionally, concerned special interest groups, such as DP auditors, security specialists, communicators, privacy proponents and bankers, have held special workshops looking to future security needs and attempting to develop problem statements, prepare security guidelines and, in a few instances, research agendas directed toward longer term problems. On the whole, however, efforts in the commercial sector have lacked the mechanisms and perspectives to look past short-term security needs.

With this historical perspective and the incidents of the "Summer of '83" fresh in our minds, what can we expect to see as enhancements to the security of sensitive and critical systems? Is there truly congruence between the security needs in the traditional defense environment and those of the business world? Can these needs be satisfied and, if so, how and when?

Statement of Security Needs

To understand how the state of security must evolve, it would be useful to focus on a general set of capabilities that systems should possess to satisfy current and future needs. The following paragraphs present a statement of need and describe the current state of the art and where we need to go.

1. People/objects attempting to access computers can be positively or reliably identified.

The need. Each person, system or system component seeking access must be identified to our system. Access authorization is a positive process in which each and every user must be predefined to the system and then must undergo positive verification of identity prior to being allowed access.

Current capability. Logical system access control is currently based

on relatively simple identification numbers and password schemes. These provisions are generally proprietary "add-ons" to the basic control features provided by the manufacturer and, as add-ons, have limits to the extent of enhancement they can offer. The effectiveness of password schemes is currently restricted by difficulty in their administration, limitations on human ability to accommodate their complexity and difficulty in detecting their compro-

mise. The more user-friendly they are, the lower the level of security they provide.

Some new approaches, based on such concepts as fingerprint identification, signature verification, hand geometry, voice prints and eyeball vein patterns are undergoing experimentation and starting to reach the market.

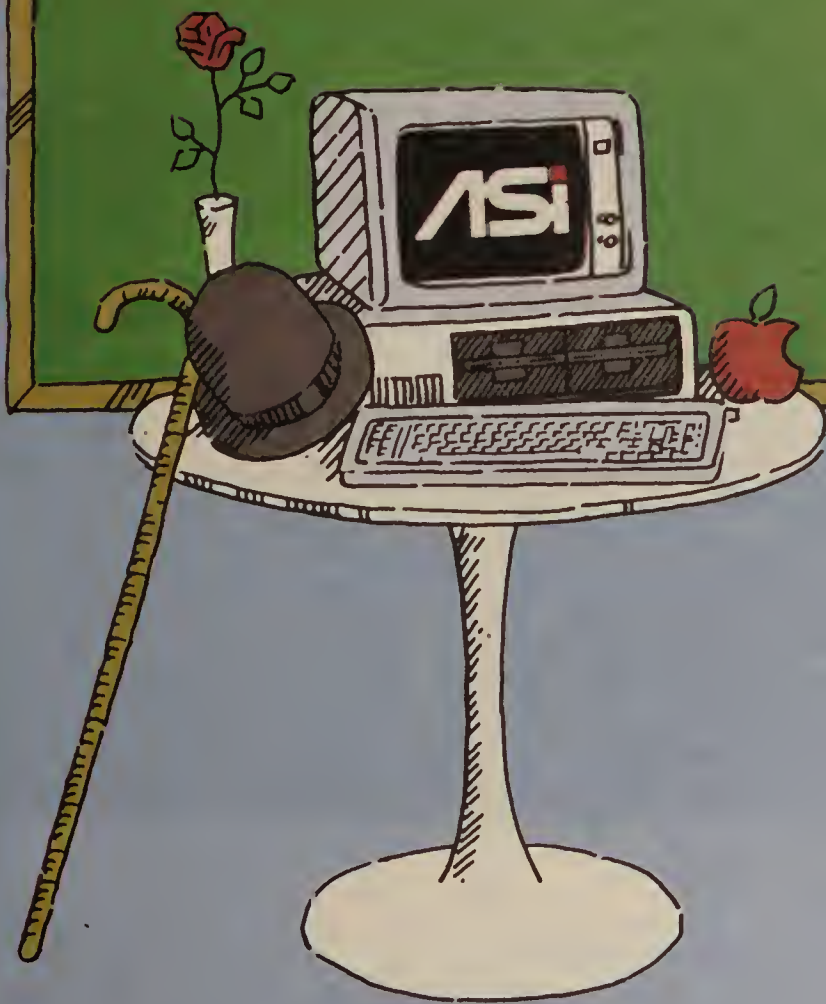
Other products on the market require the system to dial back a user at a predetermined telephone number

as part of the verification process.

Outlook. The key limitation is the inability to ensure positive personal identification. While there has been considerable effort in recent years to develop identification systems based on matching of personal characteristics, these systems are still expensive and impractical to use in high-volume, time-constrained situations. In addition, there are fairly serious privacy implications in registering such personal information in systems of

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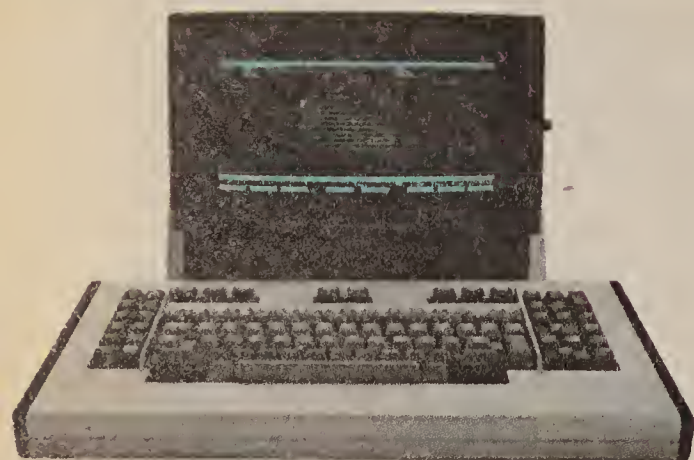
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possibly low security and integrity.

In the short to mid term, we can expect to see the use of "smart" cards and keys as an answer to current limitations in credit cards. These devices will have embedded microprocessors that can carry intelligence useful in the identification process. To assist further in overcoming the lack of positive personal identification, the identification and control process will be distributed. The individual, the identification mechanism pos-

sessed by the individual (the smart card or key), the terminal being used for the communication and the communication means itself will all play a role in the process.

In addition to individual identification mechanisms, smart cards and keys will link the user to a terminal. To facilitate this control process, more and more terminals may use embedded tamperproof chips that will transmit unique identifiers when queried.

2. Once accessing, persons/objects will be restricted to particular functions; separation of users can be reliably assured.

The need. Once access to the system has been granted, users will be subjected to positive control that will reasonably prevent unauthorized activities, thus effectively addressing the problem of authorized users exceeding their privileges. In addition, system "operators," ascribed a high degree of privilege, can be reason-

ably prevented from exceeding that authority. Users can be isolated from one another by system-logical controls. Programs can be prevented from leaking sensitive data to unauthorized users or programs.

Current capability. Today's architectures are based upon the commonly accepted practice of granting broad authority to large classes of users. Authorities for access to data bases and files are gradually becoming more granular, moving from file to record to data element. Within the current state of the art, this increased granularity of control exacts a proportionately more severe performance penalty. Most architectures are based on a two-domain operating mode — supervisory and user — which may be limited in ability to enforce the degree of security and control required in multiuser, resource-sharing networked environments.

Dynamic allocation and sharing of resources brings about timing and control problems that could result in implied or often inadvertent sharing of privileged data and resources. Confinement problems, wherein it is not possible to ensure that privileged data is not leaked to another user or resource, will cause increasingly severe problems in separating user and data.

Shortcomings in control and accountability in the activities of system operators and users in privileged mode have spawned a generation of highly specialized DP auditors dedicated to developing the mechanisms to audit privileged activities, detect abuse of privilege and enforce accountability.

Basic operating system functions are being distributed or reallocated to highly specialized processors designed to support preprocessing, communications or data base-intensive applications. These processors are also serving to distribute the control hierarchy of the overall system. Depending on the specifics of their interface, this approach can either strengthen or weaken security.

Another mechanism for confining or channeling users, thereby limiting their potential access to system resources, is that of menus and transaction systems. With menus, remote users are carefully guided step by step through the system to the resources and functions they are authorized to use.

Some limited capability to use encryption to ensure compartmentation of sensitive data within larger data bases is available, but this encryption has not enjoyed widespread acceptance because of lack of recognition of its need and also the potential complexity and increased overhead associated with its use.

Our ability to build high-integrity software and certify that it possesses the necessary security and control attributes is extremely limited. We not only cannot certify software, but we are just at the inner limits in such

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Outlook. The eventual inability of system vendors to attest to the "degree" of security afforded by their systems will pose a long-term problem. An analogy lies in the experience of vendors of encryption devices, which have their basis in proprietary algorithms. These vendors' inability to reveal their algorithm and provide specific proof of its degree of resistance to attack helped promote development of the government's Data Encryption Standard (DES) and the metrics for validating its implementation.

With increasing emphasis on the liability aspect of systems and analysis of risk, more attention will be given to the development of metrics for evaluating the security attributes of specific system architectures.

One of the current major shortcomings in security technology is the inability formally to specify, validate, verify and certify sensitive software. Rather than build software with generalized capability, state-of-the-art security aspires to produce software that will do only what it is supposed to do and no more. The quest for certifiable software is hampered by the fact that few users today have the capability to provide reasonable statements of security requirements against which developers can act with confidence. Most system specifications contain few, if any, security-relevant items.

Despite this situation, considerable work has been performed over the past eight to 10 years in the development of formal system development tools. This formalism is based upon the preparation of a statement of security requirements, which are then subjected, for example, to extensive model analysis so as to produce a formal security policy model. The model is then subjected to extensive design proving techniques, leading to both top-level and second-level specifications, which are developed using formal specification languages such as Special, Inajo or Gypsy.

The next step involves formal verification of the specifications, after which programs are generated and the code proven and verified using such tools as a code proof monitor and a programming language editor. Mathematical verification of lines of coding is the eventual goal of this effort.

These tools are evolving based on a principle of verification from level to level that specifications and codings are consistent with basic requirements. This process will map requirements from step to step on through code verification, formal proofs and eventual certification.

Currently, formal automated verification of the security attributes of sensitive software is limited to about 1,000 lines of code and is being focused on areas of security relevance. This reference monitor concept, in

which all security-relevant functions are isolated in a kernel, which is then protected and verified, has been the area most researched.

Worthy of mention at this point are the activities of the DOD Computer Security Center, which has been chartered to promote the development of more trustworthy systems and to evaluate the suitability of systems to process sensitive defense information. The center has developed evaluation criteria for a Trusted

Computing Base (TCB) which recognize four basic levels of security capability ranging from untrustworthy (thus in need of extensive physical and environmental protection) to trustworthy (capable of logical enforcement of all security requirements necessary to support processing of multiple levels of information sensitivity).

Within the TCB and its hierarchical levels (D-minimal protection; C-discretionary protection; B-manda-

tory protection; A-verified protection), few of today's systems provide A- or B-level protection. The DOD Computer Capital Center maintains and publishes an Evaluated Products List of selected industry- and government-developed trusted computer systems and computer products for government use.

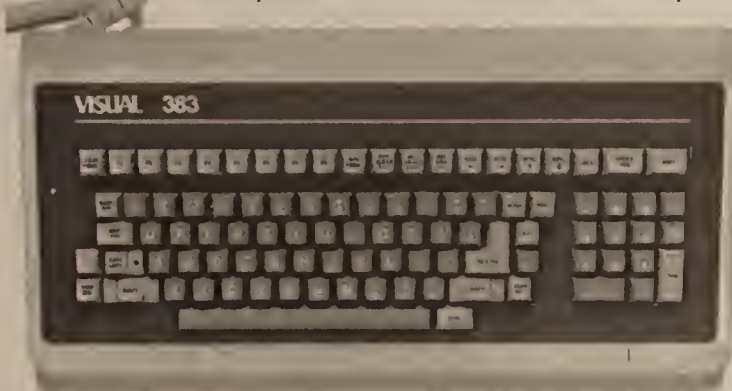
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Features. Visual incorporated the tilt and



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But looks aren't everything. What's inside puts the Visual 383 way ahead of the competition...

The selectric typewriter style keyboard with n-key rollover and sculptured keycaps has been engineered with 'capacitive-scan' technology.

They approached programmability with the same high standards. Other emulators offer you 6 or 7 programmable function keys, the Visual 383 has 16. In fact the ENTIRE keyboard can be reconfigured to meet your exact needs with all soft keys and configured screens password protected. Plus you can store up to 350+ bytes in non-volatile memory.

And designing special applications is a lot easier with the Visual 383 because the internal buffers for screen, data communications, soft keys, printer ports and local forms can be modified according to YOUR requirements.

Data communications—how could it be made faster when complex screen formats have to be repeatedly transmitted from the host? Easy, just download user screens to the terminal's forms memory for fast recall, at any time. The Visual 383 supports all standard Burroughs data communications modes including poll, select, fast select, group poll, group select, broadcast select and contention modes.

The Visual 383 line monitor mode enables you to quickly identify communications and system problems. You can assign one of the 6 standard pages of user memory to the 'line monitor page' for greater analysis capabilities.

It even supports two different polling stations so data entry and printing can take place concurrently. And the separately polled printer port supports both XON/XOFF and PRINTER/BUSY allowing you to use ANY serial RS232 printer.

Support. But the best system design in the world is only as good as the service and personal attention supporting it. At DAS we provide customized system support and fast response to your service needs—on-site, return-to-depot or board swap, from our 22 locations across the country. Our flexible financing, lease and rental programs help you keep within your budget plans.

Price. You usually get what you pay for. But with the Visual 383 you get a lot more. More features, more flexibility, AND more support.

The Visual 383 is compatible with the Visual 420, Burroughs SR100 and SR110.



| FEATURES | VISUAL VS 383 | DATAMAXX MAXXIMA 983 | DELTA DATA 2830II | BURROUGHS SR110 | BEEHIVE DM83 |
|----------------------------------------------------|---------------------------------------|---------------------------------------|-------------------|------------------|------------------|
| Screen Type | 14" Green P-31 | 12" Green P-31 | 12" Green P-31 | 12" White P-4 | 12" Green P-42 |
| No. of Pages Standard | 6* | 2 | 2 | 5* | 4* |
| Password Protected Set-Up Functions | 6 | 3 | None | None | 1 |
| XON/XOFF Printer Support | STD | NO | NO | NO | STD |
| Host Accessible Local Forms Storage Buffer | STD | NO | NO | NO | NO |
| Function Key Storage | Non-Volatile RAM with Battery Back-up | Non-Volatile RAM with Battery Back-up | — | Non-Volatile RAM | Non-Volatile RAM |
| Completely Reconfigurable Keyboard | STD | NO | NO | STD | NO |
| User Configurable Page, Data Comm, Softkey Buffers | STD | NO | NO | STD | STD |
| Time of Day Clock | STD | STD | NO | NO | STD |

*VARIABLE PAGE BUFFER (with adequate Data Comm, soft key and printer buffer)
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IN DEPTH

For the past 10 to 15 years, these defense security needs have been viewed by industry as unique to defense, with little or no commercial value. This perception has seriously hampered develop-

ment of this technology. Experience is now showing that these capabilities are not unique but have general applicability to needs of the commercial environment.

Lacking the capability to

develop this technology itself, Defense has had to operate its sensitive systems in isolation and with severe operational limitations. Lacking this technology, commercial systems will be

operating under conditions of high vulnerability for an extensive period of time.

3. *Violations of systems security can be detected (real-time or after-the-fact), documented and prosecuted.*

The need. All attempts, successful or unsuccessful, to gain unauthorized access to the system and/or unauthorized use of specific facilities can be detected. The mechanisms for such detection must also be protected from unauthorized access and safeguarded in such a manner as to prevent manipulation. Such mechanisms must satisfy legal requirements for entry as evidence into a court of law.

Current capability. Most systems provide journals and logs that collect data about system performance. Software to manipulate this data and provide meaningful performance information to security personnel is less readily available. Software to flag violations, in real-time, is also not readily available. Most add-on security software packages provide only limited reporting capability, although this situation is improving.

DP auditors are developing methods for performing in-depth audits of operating system performance through manipulation of data collected in system journals and logs as well as through the use of selected system utilities.

Understanding of how to develop and implement specific controls in an application environment is limited. DP auditors have the best appreciation of application controls, but they usually prefer to maintain independence from the control specification process. There are no accepted and comparable skill fields (such as control specialist) in the data processing field, which is hindering development of application controls.

Outlook. As demand increases, audit software will evolve with more sophisticated capabilities. The "add-on" capability will be less desirable than that developed by the vendor as part of the operating system capability, although there may be problems with the acceptability of that information from an audit perspective. This perceived lack of integrity will eventually be overcome by designing journals and logs to be tamperproof and protected from unauthorized access.

The embedded mechanisms must have enough integrity for them to be accepted as evidence in a court of law. Similar to flight data and cockpit voice recorders

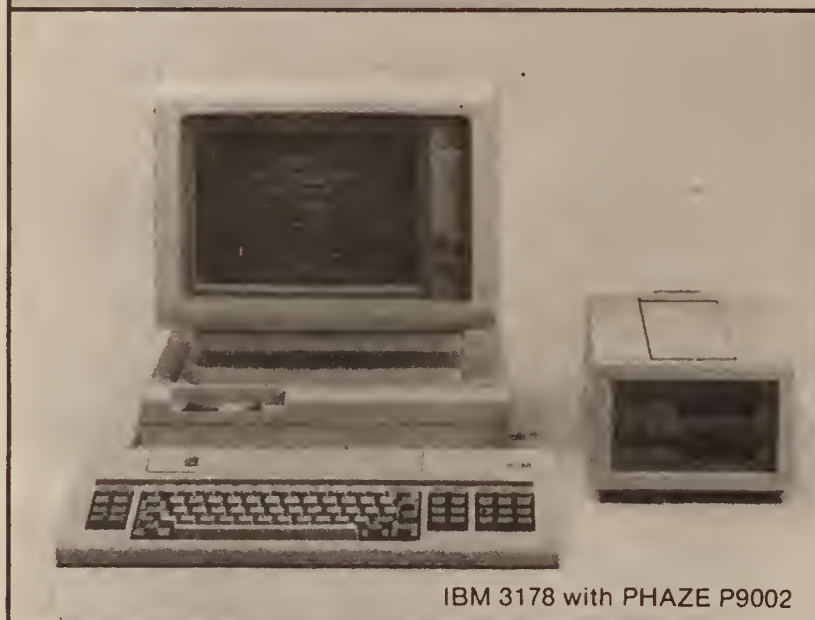
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IN DEPTH

in aircraft, they must be protected from unauthorized access in order to provide an unimpeachable source of performance data needed to document unauthorized access or use.

More trustworthy software, besides preventing unauthorized activities, will also be better able to detect and sound the alarm — in real-time, if necessary — in cases of suspected security violations. In the interim, we will probably see development of "security officer stations" that will facilitate both performance of security functions and monitoring of system activities.

Following are but a few of the functions likely to be integrated into such a station: a capability to assist in monitoring access control software; managing passwords, keywords, access numbers; reviewing states of authorization mechanisms; manipulating system journal/log data; determining status of highly sensitive files; developing and maintaining contingency plans; and performing risk analysis.

4. Messages between users and computers can be kept secret and protected against tampering, if necessary.

The need. Confidentiality and integrity of messages between individuals and/or systems can be assured. This security must be provided end to end, from originator to recipient, with verifiable proof that the confidentiality and integrity have not been breached.

Current capability. Products to protect the confidentiality of digital communications through encryption have been available for years, ranging in price from less than \$1,000 to more than \$10,000 per device. With promulgation in 1977 of its DES, the federal government attempted to provide an algorithm for encryption that would be open and public, verifiable and would promote interoperability/compatibility between devices. Despite initial criticism regarding its ability to withstand concentrated attack, the DES is gaining increasing acceptance.

The DES has been adopted for standard use by both the American National Standards Institute (Ansi) and the American Bankers Association (ABA). Recent comparisons have shown DES-based products to be significantly lower in price than non-DES,

although market influences may not yet have come to bear on non-DES products. Ansi and ABA have further adopted the DES as the basis for their recently issued Financial Institution Message

Authentication Standard, intended to ensure integrity of sensitive message traffic (such as wire transfers), where tampering, not confidentiality, is the primary concern.

The current generations of both encryption and authentication products are still considered to be too expensive (two devices are needed for each link) to apply to any but the most sensi-

tive links. There are other problems, since these products are primarily suited for synchronous, link-to-link communications, whereas user needs are oriented to asynchronous, end-to-end

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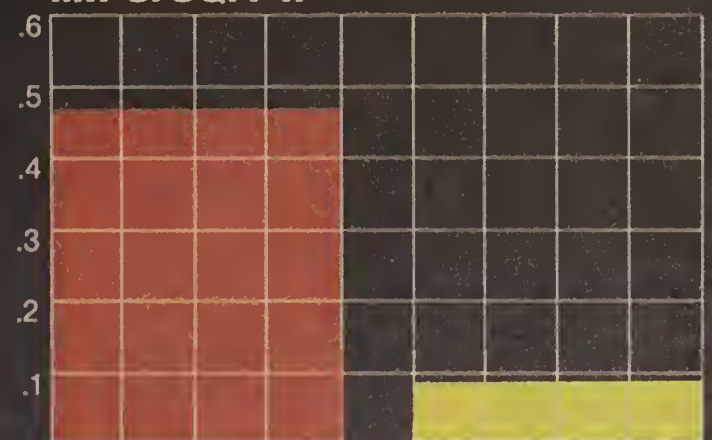
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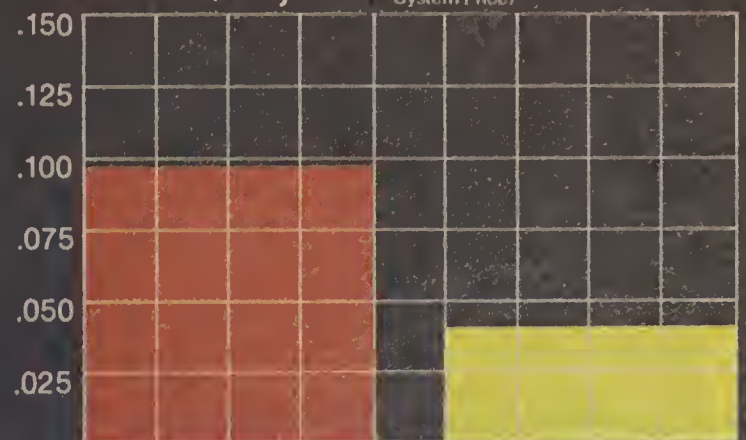
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IN DEPTH

environments where continuous protection must be provided from originator to recipient.

These shortcomings also highlight the issues of interoperability and lack of com-

patibility between products, as well as problems of encryption key management (since both sender and receiver must have the same key) across a complex, multiuser, networked environ-

ment. The solution to key management problems has been thought to lie in evolution of a public key encryption system, wherein two keys — a public key (published and available for any-

one to use to correspond secretly with the holder) and a secret key (held only by the recipient) — would facilitate communications between two parties. Once encrypted in the public key, the mes-

sage could only be decrypted by the holder of the secret key.

Unfortunately, a leading public key encryption scheme was recently "broken," and the controversy surrounding it has inhibited — at least temporarily — its widespread use.

Outlook. This area is evolving faster than any of the other major areas of need. As users develop more accurate statements of need, the market will respond with more suitable products.

Over the next one to three years, we will see the next generation of encryption/authentication products. These products will be oriented to dial-up access to asynchronous, public and value-added networks. There will still be serious interoperability and key management limitations. Prices will drop significantly below \$1,000 per unit.

Some of these early products will also offer enhanced individual and/or terminal identification capability through the use of smart cards or keys. Authentication capabilities will still be oriented toward the needs of the banking industry (primarily wholesale banking), but other limited nonbanking message authentication capabilities will begin to evolve.

In the three- to five-year period, a second generation of encryption/authentication products will come on the market. The products will emphasize standardization, interoperability and key management in their architectures. Costs for individual devices will drop to less than \$500 for a basic capability. Their application will reflect more of a "system" approach, looking to end-to-end needs. Upgradability from the previous generation of capabilities will be an issue.

An unknown quantity in this area will be the role of public key encryption systems. While it is likely that such systems will come on the market, their use may be limited until their qualities can be certified, either through experience or development of a testing metric.

5. *Both hardware and software can be made tamperproof.*

The need. Hardware and software can be developed in such a way that their design can be certified and protected against unauthorized change. Any unauthorized

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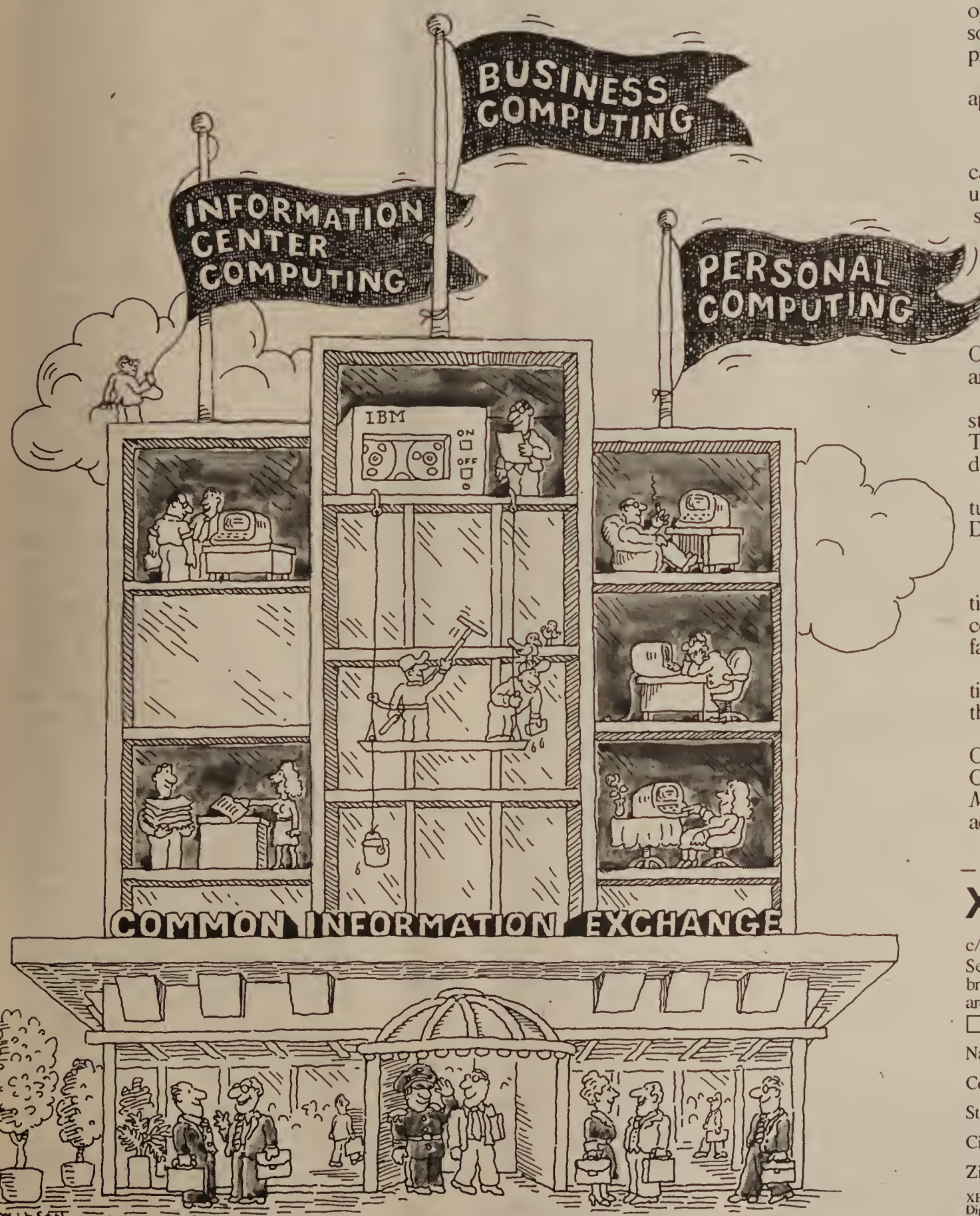
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IN DEPTH

change to certified hardware or software will be easily detectable.

Current capability. Because of the physical state of hardware, control in its development and manufacturing is somewhat more advanced than that in software. Computer-assisted design and manufacturing techniques, combined with statistical and electronic verification, allow a much higher degree of confidence to be assigned to the resultant product.

Protection against unauthorized

change is less well advanced and generally attained through use of locked or sealed cabinets. Once access has been gained to a sealed cabinet for the purpose of maintaining or changing components, the cabinet is usually resealed and verified. Where high equipment integrity is demanded, such as in the computers supporting the space shuttle system, this type of physical protection is used. Equipment integrity precautions of this nature are intended to guard

against deliberate or inadvertent changes to the equipment.

On the software side, the current state of the art generally lies in the use of libraries for cataloging operational programs and restricting privileged access to the software through administrative controls and passwords. Some verification of cataloged software to detect unauthorized change can be performed using specialized code comparators (generally not those provided as operating

system utilities). These, however, remain basically primitive.

Software integrity solutions are also found, to a certain extent, in the use of read-only memory (ROM), programmable read-only memory (Prom) and erasable programmable read-only memory (Eprom), which can provide some solution to the problem of code alteration, but not necessarily against the substitution problem. Firmware is more expensive than software to produce, but it offers better protection against tampering — particularly if it cannot be reprogrammed or otherwise changed.

Another variant of the tamper-proof requirement concerns interference with the processing through spurious radiation, electronic corruption or even intentional jamming. While not tampering in the sense being discussed here, this type of outside interference could result in loss of processing integrity. Since this is more a reliability problem, it will be discussed as a reliability requirement.

Outlook. Hardware integrity and assurances against tampering remain uncertain at this time. This issue is currently not a large security concern and will probably be one of the last frontiers to be addressed. Eventually, however, the electronic characteristics or "signature" of a hardware configuration will likely be measurable and material deviations from these parameters detectable, thereby signaling possible tampering.

Verifiable subcomponents or limited electronic verification of key components and greater use of firmware will likely precede this development. In the meantime, physically secured cabinets will suffice until software integrity issues are addressed and the physical component — hardware — becomes an unacceptably weak link.

Greater use of ROM, Prom and Eprom for highly sensitive or critical functions of limited scope will be a more frequent, but nevertheless interim, safeguard against tampering. It is more likely, however, that attention will first go to software protection. These protections will be implemented through such means as encryption of the program until it is invoked or through an authenticator, similar to a "checksum," which will be derived based upon the characteristics of the program. Unauthorized changes to the software will then also change the computed authenticator, thereby immediately revealing the loss of integrity. Under these circumstances, controls over the change process would be mandatory. These same mechanisms apply to protection of data bases in which encryption or authentication is used to "seal" all or portions of the data base when not being actively processed.

Here the fine line between the access and authorization control issues (specifications one and two above)



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grows thin. The ability to ensure this integrity during processing will be difficult and become increasingly so as more extensive use is made of adaptive programs, reentrant code and artificial intelligence techniques. Dynamic allocation of application resources will make this verification of integrity more difficult.

Software development, verification and validation and certification technologies are less well developed. Formal development methodologies and tools are evolving at a relatively slow pace, as we move from free-form environments to those using these formal development methodologies and highly structured design approaches. Some progress is being made in the federal government to apply formal or hierarchical methodologies and formal proof mechanisms to the development of more secure systems, but these are currently effectively limited to a few thousand lines of code.

Certification of software is not yet practical in today's environment. While we are developing more effective tools for use in software verification and validation, the much more stringent and rigorous certification process is further ahead. Verification and validation, through the use of software analyzers, code comparators and formal testing techniques, are moving the technology incrementally toward eventual certification.

6. *Systems can be designed with high reliability and survivability.*

The need. Critical systems, their supporting components and key facilities shall be designed so that supported organizations and users will not feel serious effects when the systems are unavailable.

Current capability. Increasing attention to reliability needs over the years has resulted in significant enhancements in our ability to provide uninterrupted computing power. Fault-tolerance objectives have focused primarily upon hardware and the likelihood of component/inter-component failure. "Mean time between failure" (MTBF) and "mean time to repair" (MTTR) are terms used to describe the measures of fault tolerance in system components. As dependence on computers has increased, so have demands for fault-tolerant systems.

Fault tolerance has been steadily raised first through engineering of individual components for greater reliability and then through the provision of redundancy for highly critical elements. Reliability demands are spawning specialized product lines featuring "fail-safe" or "non-stop" system processing capabilities. These are provided through redundancy in hardware, software and data base, using techniques such as "shadow" or "mirrored" processing and filing.

In the applications software area, more extensive use of checkpoint/restart/recovery techniques in critical applications provides increased reli-

Organizations will increasingly find that limited short-term backup and recovery planning alternatives will highlight longer term system and network survivability issues, which must be resolved through strategic planning.

ability. Specific critical components (for example, volatile memory) are being provided with limited backup

capability (motor generators, uninterruptible power supplies) so as to continue or preserve already pro-

cessed data or provide graceful component degradation.

Another reliability factor over which there is increasing concern relates to the impact of microminiaturization of components and the requirements for more protection from electromagnetic interference (EMI) or pulses (EMP). While traditionally considered to pertain only to military applications that need to survive in electronic warfare environments, EMI- and EMP-related problems may

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IN DEPTH

be coming into the commercial environment. There seems to be a relationship between the lower power/pulse requirements of microminaturized components and the increasingly intense electromagnetic environment. While less power is needed for miniaturized processors, that power must be of a higher quality.

There is mounting evidence of potential problems with both power and spurious radiation in the newest generation of commercial air trans-

ports. Aviation technology is rapidly turning more and more aircraft control functions over to computers as pilots fly aircraft not through direct manual or even hydraulic controls, but through the computers. This "fly-by-wire" mode places exceptional reliance upon the computer. Various unexplained computer malfunctions, loss of data and function, as well as losses of power, signal a need for caution in this area. The use of powerful portable computers on-

board commercial aircraft is slowly being banned as concern over these unexplained phenomena grows.

Beyond the reliability issue is that of survivability.

Component and system redundancies do not guard against catastrophic failure or unacceptable delays in processing. These require sufficient facility redundancy to support critical processing and can be accomplished through such means as dual processing facilities, load-level-

ing or dynamic allocation of processing across multiple facilities, or operational standby facilities.

Extensive networking and telecommunications has developed haphazardly so far, with the trend toward integration of communications facilities lending, at least temporarily, to the increased vulnerability. Except for backup for specific links (dial backup), most internal telecommunications networks lack survivability through alternate routing. Systems using extensive telecommunications support generally have not evolved with system backup capabilities.

Outlook. Because of various pressures (regulatory, legal and operational), most organizations will have to develop some type of disaster recovery capability within the next three to five years.

For organizations with large, integrated computing systems, this process itself will take three to five years to accomplish as major problems, issues and complex planning tasks are resolved.

Organizations will increasingly find that limited short-term backup and recovery planning alternatives will highlight longer term system and network survivability issues, which must be resolved through strategic planning.

A veritable explosion in communications technology over the next five to eight years will offer many alternative communications options, thus focusing upon systems backup needs. Extensive applications systems redesign will be required in order to implement such techniques as distributed processing, load leveling and broader "mirroring" or "shadowing" across multiple, physically dislocated processes.

The EMI/EMP problem will become more challenging as the ambient level of electronic clutter increases, largely because of the explosion in the use of microprocessor-based technology. Attention to component isolation and shielding needs will receive more design emphasis.

In this first installment, we have looked at the current state of computer security technology, presented a capabilities-based statement of need and assessed where we are in relation to those needs. In the next installment, we will delve into the prospects for the future, how long it will take this secure technology to become available, what forces and influences will bring it about and, finally, what can be done — what you can do — to help bring it about.

About the Author

Robert Campbell is president of Advanced Information Management, Inc., a Woodbridge, Va., consulting firm specializing in computer and telecommunications security, privacy and audit. He has more than 20 years' experience in data processing, security and audit in both government and industry.

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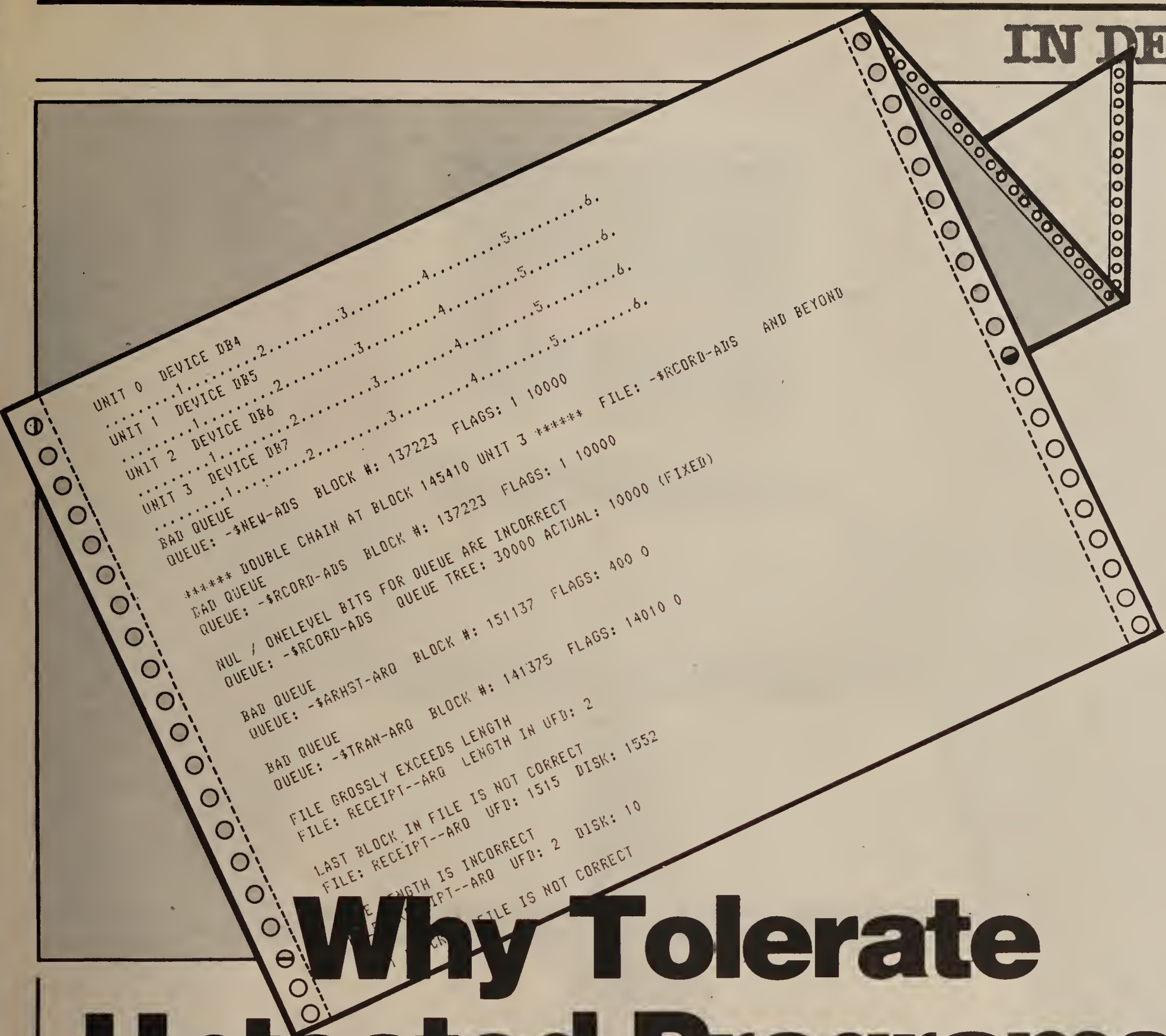
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UNIT 0 DEVICE DB4 .....6.
UNIT 1 DEVICE DB5 .....6.
UNIT 2 DEVICE DB6 .....6.
UNIT 3 DEVICE DB7 .....6.
BAD QUEUE .....6.
QUEUE: -NEW-ADS BLOCK #: 137223 FLAGS: 1 10000
***** DOUBLE CHAIN AT BLOCK 145410 UNIT 3 ***** FILE: -RCORD-ADS AND BEYOND
BAD QUEUE
QUEUE: -RCORD-ADS BLOCK #: 137223 FLAGS: 1 10000
NUL / ONELEVEL BITS FOR QUEUE ARE INCORRECT
QUEUE: -RCORD-ADS QUEUE TREE: 30000 ACTUAL: 10000 (FIXED)
BAD QUEUE
QUEUE: -ARHST-ARQ BLOCK #: 151137 FLAGS: 400 0
BAD QUEUE
QUEUE: -TRAN-ARQ BLOCK #: 141375 FLAGS: 14010 0
FILE GROSSLY EXCEEDS LENGTH
FILE: RECEIPT--ARQ LENGTH IN UFD: 2
LAST BLOCK IN FILE IS NOT CORRECT
FILE: RECEIPT--ARQ UFD: 1515 DISK: 1552
FILE LENGTH IS INCORRECT
FILE: RECEIPT--ARQ UFD: 2 DISK: 10
FILE IS NOT CORRECT
  
```

Why Tolerate Untested Programs?

By James H. Bradley

Half of all software development costs (or one-fourth of life-cycle costs) are spent on testing software after it is coded. Nevertheless, internal and external clients all too often take delivery of a seriously flawed product.

Cost-effective testing begins at the first moment of conception, continues throughout the life cycle and influences every tool of analysis, design, implementation and maintenance. The doctrine that "All testing is in the reverse sequence of specification" produces only disasters, such as the air traffic control system.

Top-down methods can be perverted into a separation of authority from responsibility. A lack of thorough, objective walk-throughs or political manipulation of walk-throughs is a reliable early sign of disaster, for the testing process has already gone

awry. When the analysis is called complete, ask to see the test report.

The resulting costs of software errors can be reduced by systematic, scientific, nondogmatic use of modern tools accompanied by management practices designed to account costs to their true causes and to provide working conditions free from noise and distractions. Never buy a piece of code built on a Monday.

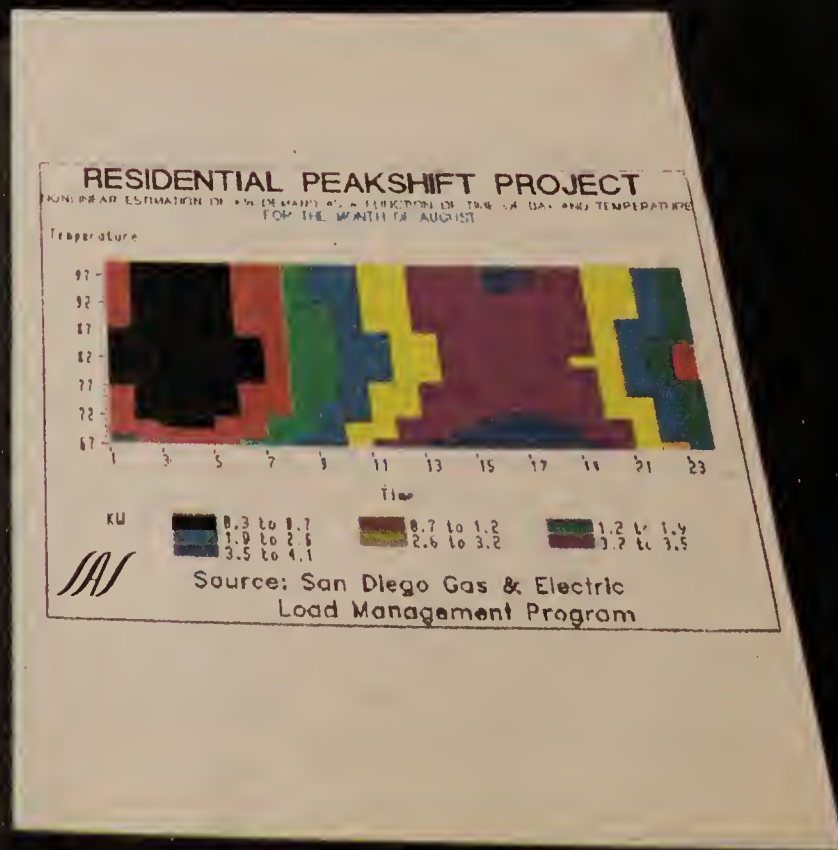
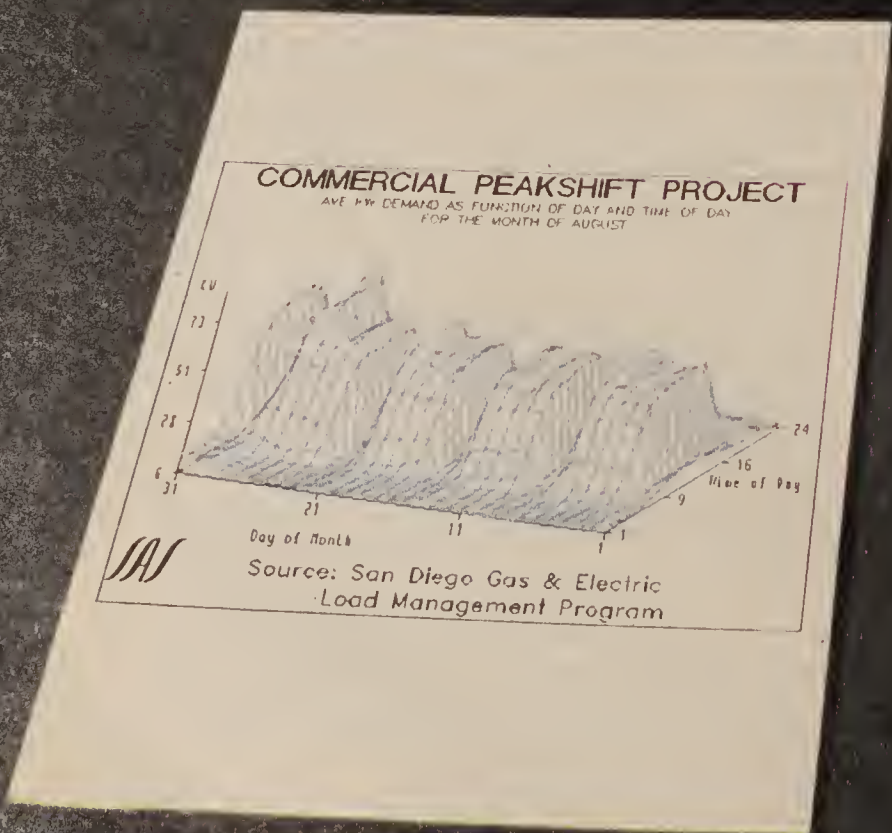
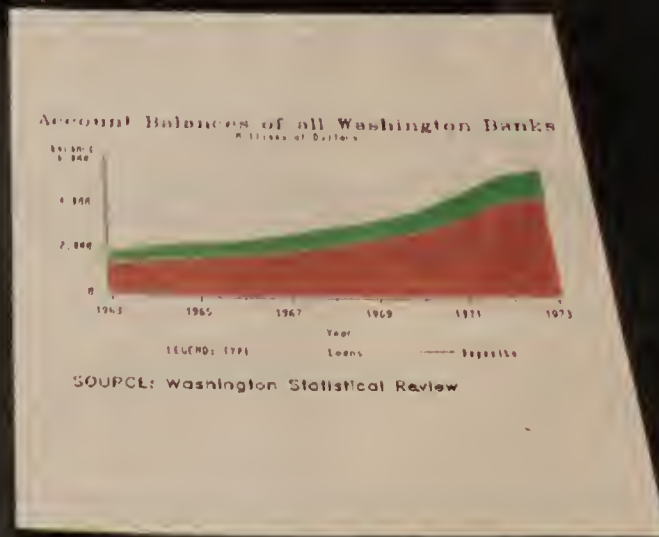
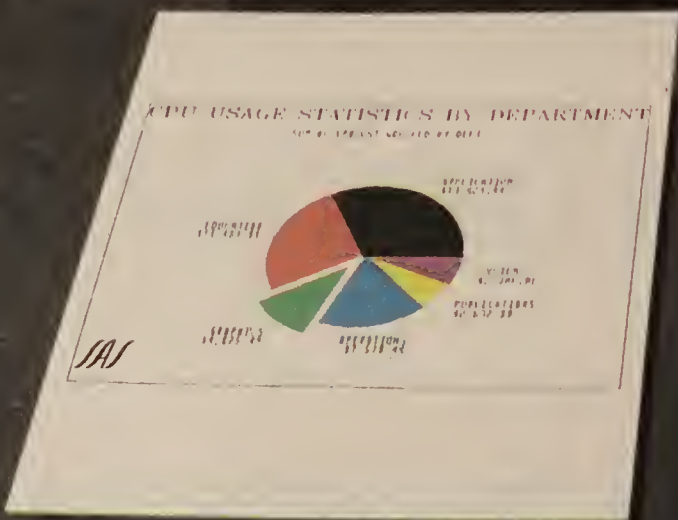
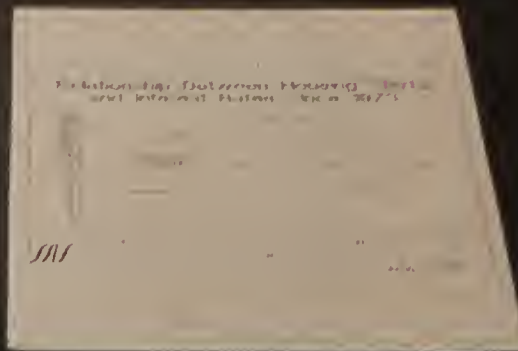
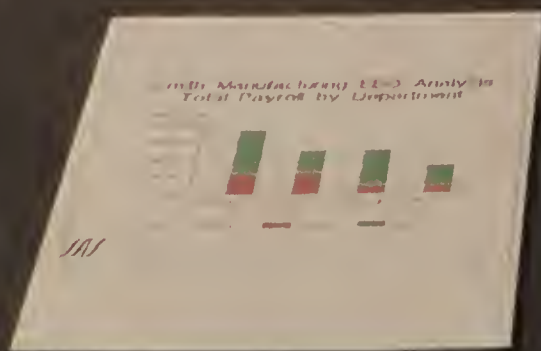
Professionally used, traditional structured analysis and system specification are valuable because one can simulate some key elements largely on paper or as prototype versions on a machine. In the hands of unqualified people, such powerful tools produce great disasters.

There can never be any universal rules or methods for software; methods are guidelines, not gods. Structured analysis is often supplemented

by structured design, which is still influenced by the artificial-tree structure of the flow of control enforced by current commercial compiler systems. However, code can be designed and implemented for systematic, perpetual ease of testing via a few simple software tools that require no special job control language, no special compilation or link loading, no tripling of execution time and memory and little special documentation.

Under these conditions, debugging for localized, individually identifiable bugs becomes a systematic procedure. Obviously, some bugs are neither local nor clearly identifiable; it is a simple truth in much of mathematics, engineering and science that given an algorithm, one can immediately provide a practical case in which it fails.

The basic tools of structured



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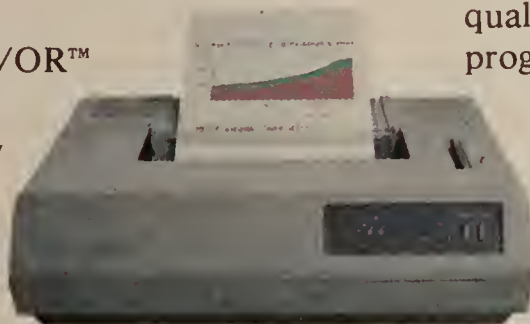
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IN DEPTH

analysis and system specification include the graphical tools of data flow diagrams (or engineering equivalents) for data in motion, entity-relationship diagrams to describe the logical roles of data at rest and state transition diagrams to describe the logical modes of operation. For each (possibly generic) data flow, process, entity, relationship, state and state transition there is basically a corresponding textual definition (which can be tabular or a Boolean diagram,

in certain cases).

In addition, certain classes of entity or process may be systematically omitted for clear simplicity, as though in a view, projection or selection. For example, a plant monitoring system may be omitted or shown by some conventional symbol or the availability of Help menus may be left out by convention among the analysts and users.

Further, conditional diagrams often depict only one (or a few)

mode(s) of operation. Precedence/antecedence diagrams (Perts) are used for partially ordered steps. The aim is unambiguity, ease of human comprehension and debugging by means of paper simulations. Beware of novices who seek to replace three pages of simple engineering diagrams and documentation with 10,000 pages of data flow dictionaries and repetitious mini-specifications.

Structured methods are also beneficial in reducing the high rate at

which software wears out beyond repair.

Some companies in engineering simulation cut the costs of testing, documentation and maintenance through software tools of widely varying competence. These include:

- A computer data base (from a rigid report generator such as the Sperry Corp. Mapper to a fully relational system) for variable names, synonyms, descriptions, definitions and memory locations in global storage blocks.

- A preprocessor for code to insert documentation of inputs and outputs, build functionally equivalent definitions of each global storage block and replace synonyms in the code.

- One or more interactive scanning and/or assignment tools, basically to read and/or write any variable by its symbolic name with no perceptible disturbance to normal execution (under tight security if necessary; it is a DP auditor's nightmare).

- An event manager or simulation executive architecture to handle queues, flags, semaphores, cyclic execution, panel triggers, internal triggers and the distribution of events to interested parties.

- Basically one execution counter per module, monitorable by the scanning tool.

- Basically one execution flag per module to enable/inhibit execution..

- Basically one normal/stub flag per module to select normal vs. simple stub code.

- Basically having each module write all its outputs into one (or two) dedicated global storage block(s). Conversely, each storage block is written by only one module.

- Naming conventions so that each compiler name shows the software subsystem that computes that variable.

- Basically a unique source for each variable, except for some semaphores, tables of attributes and other special cases. This principle is not necessarily valid in compilers and operating systems.

- A careful integration plan resembling the Yourdon, Inc. doctrine of "usable versions," but also allowing separate tests of subsystems and of partially integrated systems even when the top-level discrete control is not yet operational.

- Flags to allow testing of first- and second-level backup code or other spare parts for software.

- Flags for a selective execution trace and/or selective dump of data.

In addition, many current operating systems and compilers provide facilities to test loop limits, test subscript ranges, trace execution, selectively dump, inhibit transfers and insert pauses. Special JCL, compilation, link loading, memory requirements and file linkage cost money; the error rate in failure to remove obsolete diagnostics is not negligible, and if the apparatus is ever needed again, it



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IN DEPTH

has to be put back by hand (some systems allow conditional JCL and/or compilation).

Most current operating systems and some compilers have one or more commands such as INCLUDE (file name), so that one file of code and/or commentary can be part of several modules and/or specifications and/or manuals. In some systems, graphics can be printed along with text.

To my knowledge, software is the

only risk for which monetary insurance cannot be purchased today. Ask vendors to quote separately for such insurance. Seek quotations on the open market. Insist that the future suppliers of software insurance break down their charges according to vendors and products. Even private aviation and mountain sports qualify for insurance coverage at a price. Computer hardware is insurable.

Do everything managerially pos-

sible to charge back the true cost of bugs to their originators. Give top-level management an accurate view of the costs of each defective piece of software. Which vendors offer adequate cost-recovery warranties on their software? Which vendors state mean time between failures and mean time to repair? Which vendors leave previous releases available? Which vendors demand enormous, unascertainable detail of each failure in their unmodular systems?

Which vendors use good techniques of information hiding or information insulation? Which vendors allow users to generate selective trace, dumps and other execution-time diagnostics? Which vendors provide prompt, accurate, informative bulletins of known bugs or limitations? Do you have sensible, contractual acceptance tests? Do you have penalty clauses and premium clauses based on performance?

Sir Isaac Newton (of apple fame) first showed that spare parts must be built into reliable software and shipped with the original product. He was concerned not only with failures of his pencil-and-paper processor, but also with erroneous algorithms, unforeseen special cases and fundamental problems of accuracy, computability, computational complexity, forward error recovery and other such phenomena which are steadily growing in economic importance to data processing.

Basically, reputable software has from 0% to 5% of the executed code merely checking for things that should never happen, such as the acceptability of inputs and the consistency of outputs (audits or controls, in the terminology of Al Brill's new *Building Controls Into Structured Systems*).

Good methods can be found in a multitude of ancient textbooks on manual data processing and on work with mechanical desk calculators. On the other hand, genuine spare parts for software are executed only when some bug or problem is detected in the normal code. Often, previous releases of the same software are used as first and second backup spare parts; thus, the additional development cost of reliable software varies from a few percent in compilers and elementary data processing to 500% in the subtlest mathematical tasks. The additional costs in memory for code range from nothing to 10%, depending upon the application; the average is probably around 2%.

The spare parts in reliable software are testable only by means of special bypass flags, unless the normal code is indeed inadequate. Thus, the doctrines of 100% testing or of executing every line of code, propounded by some consultants, refer only to *unreliable* code. On the other hand, pay a rational price for the insurance of reliable software; ignore snake-oil merchants who say that you *could* be struck by a meteor.

Since the 1950s, fault-tolerant, reliable software with spare parts has been used by Bell Laboratories (in the electronic switching systems), the University of Newcastle-on-Tyne and the Michigan Terminal System, among others. Forward error recovery (discard unresolvable problems to a maintenance file, as in telephone switching) and backward error recovery (go back and try again, possibly with a spare parts algorithm) are treated in many textbooks. Several good papers are in *Current Trends in*

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Programming Methodology (R.T. Yeh, editor, Prentice-Hall, 1977, four volumes)

Predictable Results?

There is a myth that all test results are predictable and are based on the analysis and specification. Consider, however, the Eight-Queens Problem, to place eight queens (or n queens) on an 8-by-8 chessboard so that no two are on the same row, column or diagonal. There are 92 solutions and 16.8 million nonsolutions, a few of which are related to special cases of the Seven-Queens or Nine-Queens Problem (354 solutions and 387 million nonsolutions).

Testing is based on facts that *cannot be exploited* in the analysis, design or implementation; any rotation or flip of the board produces another solution. The work to predict all the test results by hand is unthinkable. The N-Queens Problem is merely a simple teaching prototype of tasks in scheduling and switching.

Almost all scheduling tasks (operating systems, elevators, sales staff, truck packing, telephone routing, disk seeking) are of the intractable class called "nonpolynomial complete."

The algorithms used are heuristic; whereas they work well on the average, some of them can produce disastrous results in rare cases that nobody can predict, explain or cure. Obviously an unfeasible schedule is unacceptable, and an elevator that goes to the wrong floor is not working. Yet normally nobody can predict the test results for timing, sequence, average efficiency or worst-case performance of scheduling algorithms.

Accounting and many branches of engineering use tests of invariants — quantities that should not change — such as assets minus net inflows. Some such fiscal controls may be permanently embedded in the code, but others are used only for testing, depending on the cost. Sorting algorithms and some branches of statistics test by means of consistency, but the details are not predictable.

Nuclear reactor calculations and many other branches of chemistry and physics use tests for self-consistency almost exclusively. Local error estimates are routine in economic models and other tasks in ordinary differential equations. An engineering package once caused a building to have only half the necessary number of steel beams; a simple test by back-substitution would have revealed the bug (is the purported solution of the equations really a solution?).

One hundred percent prediction of test results is hardly ever economical even in the rare cases when it is feasible. The actual testing of software, even in elementary data processing, has been grievously degraded by the false doctrine of 100% predictable test results. Of course, the test results should not be totally

Do everything managerially possible to charge back the true cost of bugs to their originators. Give top-level management an accurate view of the costs of each defective piece of software.

unpredictable either.

Basic treatments of systematic testing are given in various publications

and classes, in the well-known text *The Art of Software Testing* (by G.J. Myers, Wiley, 1979) and in *Software*

System Testing and Quality Assurance (by B. Beizer, Van Nostrand, 1983). These include path tests (of every line of code), condition coverage, the prohibitive (and unfeasible in reliable code) decision/condition and multiple-condition coverages, equivalence classes (cases that should be handled similarly), boundary value tests (separations between equivalence classes), loops with bypass/1 pass/2 passes/typical/maximum/maximum - 1/maximum + 1, stress

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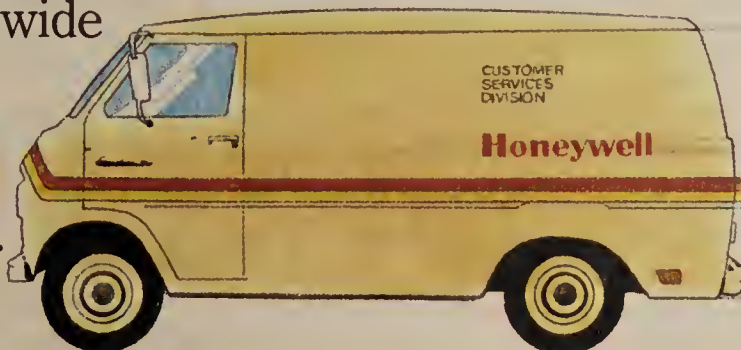
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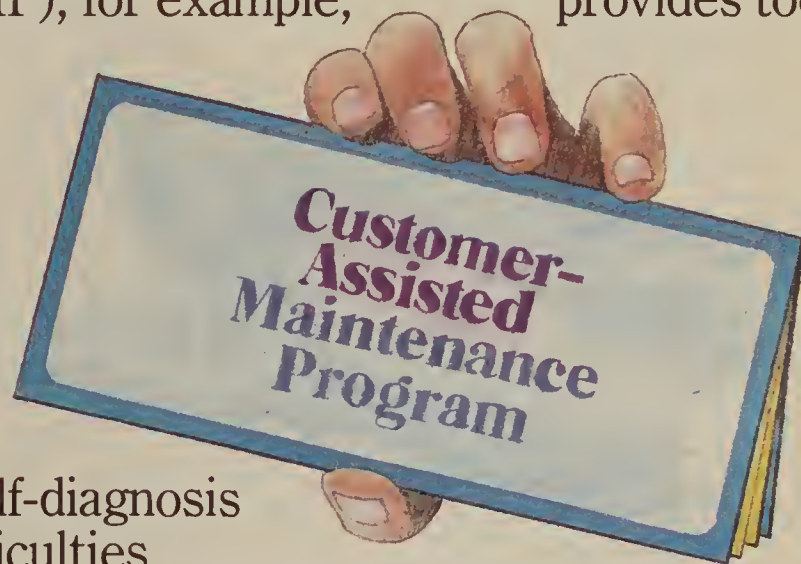


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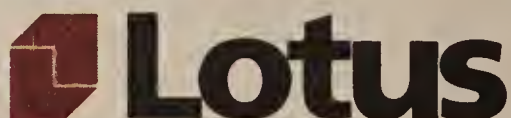
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tests (high system loads), bad inputs, excess inputs, too few inputs, null inputs, mixed-up delimiters, wrong sequences of inputs and so on.

Design strategies to facilitate testing are usually classified as top-down (build the boss on the artificial structure chart first), bottom-up (build from the bottom with drivers) or sandwich (build from top and bottom and hope to meet in the middle).

A variant on top-down methods is the doctrine of usable versions, in which the user sees some workable functions very early, and stubs are progressively replaced. However, we can now modify the method of usable versions by judicious use of an antisandwich method, in which one starts in the middle and builds both up and down, producing workable functions as early as possible.

For example, one could test a deposit to a checking account at the same time as tests of the grant of a swing loan, even though the boss transaction center (to sort out classes of transaction) was just a skeleton driver module. Analogously, many subordinate functions can produce usable output even though the central transform of a discrete sequential controller (for example, a turbine runup/runback controller) does not yet exist.

Many functions of an autopilot can be tested without the global guidance along a sequence of preprogrammed checkpoints constituting a flight of 10,000 kilometers.

In short, design strategies for ease of testing are now to be regarded as only locally top-down or locally bottom-up, including up-then-down or inverted horseshoe paths and down-then-up paths for utility modules.

The antisandwich method makes substantial use of state transition logic. Especially if one has a reasonable system of execution flags and an interactive scanning/assignment tool (to reduce the use of stubs and drivers), tests of the state transition logic can often be made in parallel with other tests. In fact, reasonable tools allow a high degree of parallelism in the testing of modules that do not interact directly. The method of decoupled merger, discussed below, provides even more flexibility.

Another point about testing is that Myers' concept of equivalence classes is neither rigorous nor exhaustive. For example, trigonometric functions of an angle or interest on a bank account (presumably calculated by logarithms and antilogarithms) should vary smoothly. Testing should look for unintended jumps and unsmooth slopes within supposed equivalence classes, in conjunction with provable properties that were not used in the implementation, such as the identity: $\sin(A + B) = \sin A \cos B + \cos A \sin B$.

Many codes in statistics, ordinary differential equations and graphics (among others) compute the boundary values between equivalence classes; thus the tester cannot, for

practical purposes, know in advance where the boundaries are. Good, powerful, general-purpose packages should not be prohibited simply because subtlety is needed to test them effectively.

Now one can bring together the tools and methods mentioned throughout this article, plus a few more, into the method of design for perpetual testability. Most of these tools exist in some environments, but beware of claims that they are off-

the-shelf products. Perpetually testable code is usually organized in several classes of execution under one or more executives. The executive does little except call other modules on the basis of their execution flags while acting as an event manager to distribute interesting events. The execution of each module (subject to its main flag) may be:

1. Cyclic, at several different but simply related frequencies.
2. Externally triggered, internally

triggered or both (event-oriented).

3. Piecewise cyclic for models which, once started, must run until an event stops them.

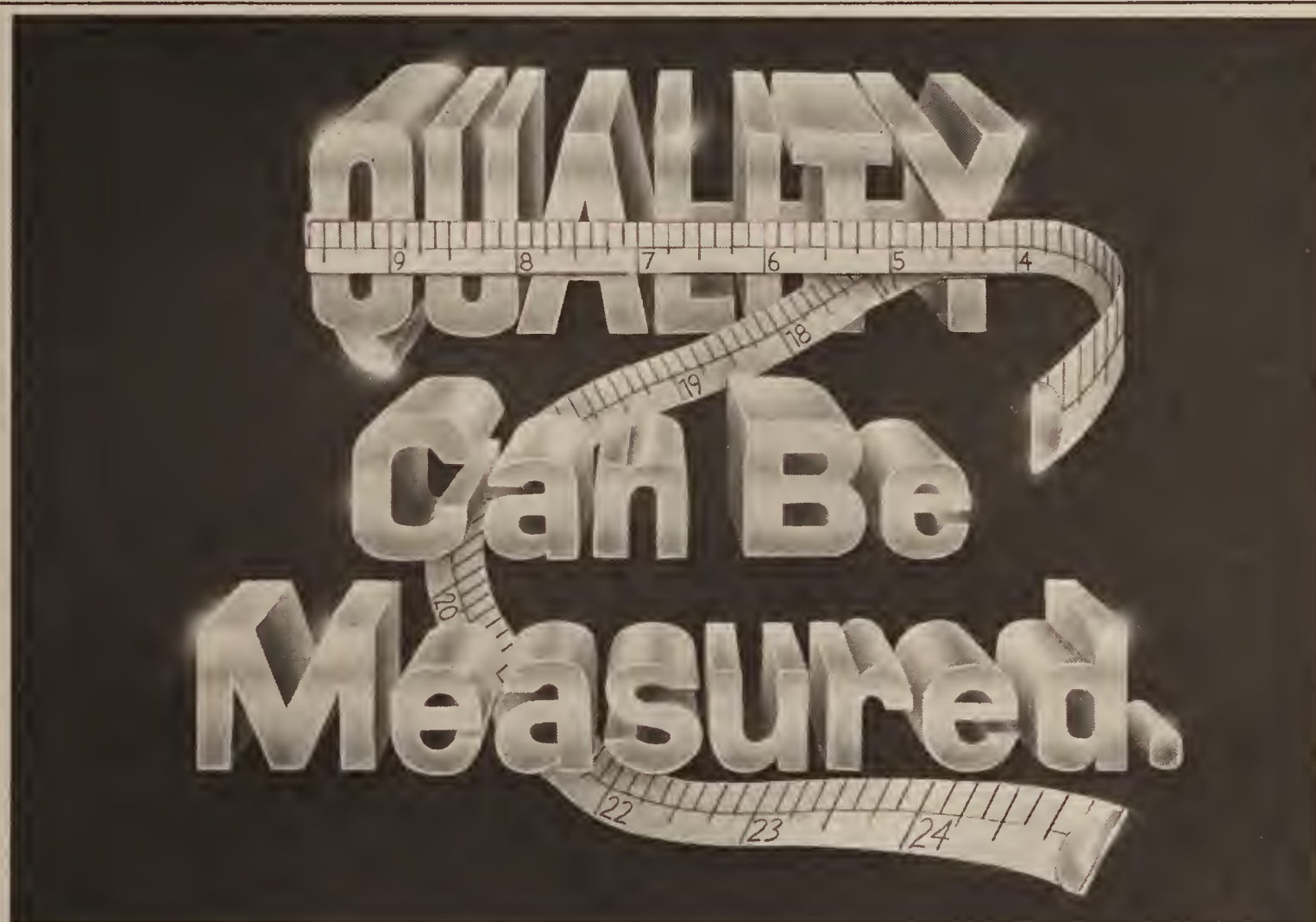
4. Interrupt-driven.

5. Self-retriggered; but replicate code is usually better.

6. Directly invoked by other code, usually in a table-driven mode.

7. Queued.

8. Triggered by the receipt of its inputs, requests for its outputs or both classes of event.



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9. Various combinations, adaptations, wrinkles and bypasses on the above classes.

Basically each module has one execution counter, one flag for normal-vs.-stub functions, possibly some flags for input/output trace and dumps and one dedicated global storage area or two for all its outputs and internal memories. Each variable has one source, except for flags, semaphores, initialization mechanisms and attribute-collectors in

Design strategies to facilitate testing are usually classified as top-down (build the boss on the artificial structure chart first), bottom-up (build from the bottom with drivers) or sandwich (build from top and bottom and hope to meet in the middle).

compilers; the handling of masked data structures such as queues and stacks is usually via utility access rou-

tines. All the global storage blocks are accessible via an interactive, cyclic scanning/assignment tool capa-

ble of handling prestored files of commands.

The spare parts, if any, are testable via special flags; however, state transition logic rarely has any spare parts beyond a few error-blocking interlocks and maybe forward/backward error-recovery facilities. Utility functions and anything else possible are built as black boxes or abstract machines performing defined functions through adequately designed and documented interfaces essentially independent of the data layouts. The details of linkage via global storage blocks are handled by a code preprocessor. As the last tool for maximal flexibility in integration plans, one has the method of decouplable merger.

In decouplable merger, module A is eventually to send its outputs to modules B, C, D and so on via global storage block G1. On a certain date early in the implementation phase, an exact copy G2 of G1 is made in different memory locations. Thereafter, modules B, C, D and so on use G1 as their input, and the definition of G1 is changed only at the convenience of its users (all additions replace spares at the end; nothing is deleted).

Module A uses G2, which is changed solely at the convenience of its user (who keeps in touch with the creators of B, C, D and so on).

When integration begins, a special routine with its own execution flag maps G2 into G1. The data transfer from A to B, C, D and so on can be turned on or off any number of times. When integration is complete, the sequence of names in G1 is brought into agreement with G2; G2 is abolished, along with the special transfer routine. All modules (A, B, C, D and so on) are recompiled at this time. One simple extension is that the special transfer routine may not be abolished, so that G1 and G2 always exist. Variations upon the theme of decouplable merger can be created for more subtle cases.

Nightmare of Bureaucracy

Permanent testability has nothing to do with the fallacy that every test must be repeated after every change to the code. Such a doctrine is a very expensive nightmare of bureaucracy and demoralization. The repetition of every test is clearly relevant only to unreliable software.

Permanent testability is supported by antibugging, which I have extended from Ed Yourdon's *Techniques of Program Structure and Design* (Prentice-Hall, 1976). Some techniques are the use of checksums, checkvalues, flags and invariants that are likely to become incorrect if code or data are damaged. Error-detecting or correcting codes are used in some cases.

Some reliable software uses one or more "batons," "keys," or "relay runners," which are periodically checked for validity to detect improper jumps. Permanent execution traces, selective dumps and execution counters have been mentioned

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before. Forward and backward error recovery can be supplemented, in certain cases only, by methods of successive approximation for the solution of equations. Al Brill's *Building Controls into Structured Systems* (Yourdon, 1983) covers many topics that are illustrated by the following anecdotes.

A large money fund has table-driven software which, at each transaction (and once a month), lists all transactions by means of a January

starting balance, a journal of transaction codes and a journal of transaction amounts. I happened to have performed an unusual transaction to correct an accidental overpayment to a retirement account. One day, months later, the master table of valid transaction codes was changed to eliminate the code for my unusual transaction. Consequently, the next monthly statement was wrong, retroactively, for months.

No human was notified of the discrepancy.

Apparently the books still balanced. The ordinary staff is denied access to the relevant files and history. The money fund declined to engage me as a software consultant, but they did correct my account. The auditors, a most prestigious firm, had not noticed the lack of fiscal controls.

Later I learned of a bank that each night simply discarded the discrepancy file from its journal; even the data processing manager was not allowed to find out what bugs it might

reveal.

At least software should force the existence and nature of discrepancies to come to human attention.

Systematic Debugging

Finally we come to systematic debugging (for local bugs), supported by all the tools of perpetual testability and antibugging.

Systematically use data flow diagrams and connectivity diagrams to trace the possible causes of erroneous values, bearing in mind the alternative that an error in the data masking arrangements may create symptoms remote from the true cause.

Predict other possible discrepancies that might arise from the same postulated cause. For example, if gross wages are incorrect, then probably net wages, income taxes and Social Security taxes will also be wrong.

Partition possible causes, use the permanent stub code and partition again. For example, when a fan in my office would not work on the end of an extension cord, I plugged another appliance into the extension cord and the fan directly into a wall socket. Turn off the execution flags of modules that generate suspected data items, and drive their outputs by means of an interactive scanning/assignment tool.

If a module is not being executed, its execution counter should not change, and the assignment tool should be able to give any values to its outputs.

On the other hand, if a module is being executed, then its counter should change and it should overwrite its outputs (or some of them). Some scanning tools automatically highlight, flash or display in a different color the names and current values of variables (from a specified list) that have recently changed.

Debugging is no longer a black art; now it is one of the most systematic parts of the experimental sciences.

Why tolerate untested programs? There is no reason to do so. Shift the costs back to the budgets of their true causes. Remember that bugs come in flocks; noise, interruptions, telephones, paging systems and disruptive management may be the real source of your problems.

About the Author

James Bradley is an independent consultant and teacher, an instructor for Yourdon, Inc. and an adjunct professor at the New Jersey Institute of Technology. He has more than 20 years' experience in engineering, scientific and general software.

Bradley specializes in structured methods as well as auxiliary software such as relational data bases, code preprocessors, executives for various classes of invocation, software devices to read/write any variable concurrently with execution of software under test and translators for simulation languages.

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COHESION

A Means to Data Base Flexibility

By William R. Durell

The return on investment or cost effectiveness of a data processing system is directly related to its life span and maintainability. To increase system life span and decrease future maintenance costs, we have adopted techniques to maximize the modularity or flexibility of systems and program design. However, we must also develop techniques to maximize the modularity and flexibility of data bases and other data structures used by data processing systems. Data cohesion is one such technique.

To understand data coupling and cohesion, we must first understand process coupling and cohesion.

The term "process" means something that acts upon data.

A process transforms, computes or manipulates data. In physical terms, a process is a program, submodule or subroutine.

Structured analysis and design methodologies advocate the design of data processing systems composed of many small cohesive modules. A cohesive module is a process with one and only one function. The purpose of a cohesive module can be described in one to two paragraphs of documentation. In terms of Cobol, a cohesive module is one whose procedure division normally consists of 100 or fewer lines of code.

There are several benefits of process cohesion. Process cohesion minimizes the coupling between programs, which simplifies the structure of the system and makes it easier to identify programs via their functions. Thus, it is easier to locate and modify specific functions within a system, and future program

maintenance expenditures are reduced. Also, by minimizing program coupling, it is easy to reuse a given process elsewhere in a system. We can more easily clone cohesive programs from one system to another.

The same principle applies to data structures. We should create data structures based upon a series of simple, cohesive data elements. A cohesive data element has one and only one purpose. If the definition of a data element cannot be stated in one or two simple sentences, then it is not cohesive. A cohesive data element minimizes the coupling between itself and other data elements. In a record or segment, there should be no linkage among nonkey data elements. Nonkey data elements should only be coupled with key data elements. This stricture is identical to the principle of third normal form.

By maximizing data element

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cohesion and minimizing data element coupling, we design more modular, reusable and portable data structures.

Following is an example of data coupling and cohesion:

Data element: VAC-PAY-YTD-HR-EMP.

Description: The total yearly vacation wages paid to an hourly employee.

Is this a cohesive data element?

No. This data element not only contains an earning amount, but also describes the type of earning (VAC or vacation).

Let us decompose or modularize the data element. VAC-PAY-YTD-HR-EMP becomes the two data elements: PAY-TYPE-CODE and PAY-YTD-HR-EMP.

The definitions for these two data elements are as follows:

Data element: PAY-TYPE-CODE.

Description: A code that identifies the category of wages paid to an employee. Examples are regular pay, sick pay, vacation pay and overtime pay.

Data element: PAY-YTD-HR-EMP.

Description: The yearly earning amount for an hourly employee. Refer to PAY-TYPE-CODE for a list of all possible earning codes.

Is PAY-YTD-HR-EMP a cohesive data element? No.

This data element contains information about both an earning amount and the period of time when this amount was earned.

Let us decompose or modularize this data element. PAY-YTD-HR-EMP becomes TIME-PERIOD-CODE and PAY-HR-EMP.

The definitions for these two data

elements are as follows:

Data element: TIME-PERIOD-CODE.

Description: A code that indicates a time span.

Examples are: weekly (week-to-date or WTD), monthly (month-to-date or MTD), quarterly (quarter-to-date or QTD) and annual (year-to-date or YTD).

Data element: PAY-HR-EMP.

Description: The amount of wages paid to an hourly employee. PAY-TYPE-CODE identifies the type of wage this amount reflects. TIME-PERIOD-CODE identifies the time span covered.

Is PAY-HR-EMP a cohesive data element? No. This data element contains information about both an earning amount (PAY) and the type of employee (HR or hourly).

Let us decompose this data element. PAY-HR-EMP becomes PAY-AMOUNT and EMP-CLASSIFICATION-CODE.

The definitions for these two data elements are as follows:

Data element: PAY-AMOUNT.

Description: The amount of wages paid to an employee. PAY-TYPE-CODE identifies the type of wage this amount reflects. TIME-PERIOD-

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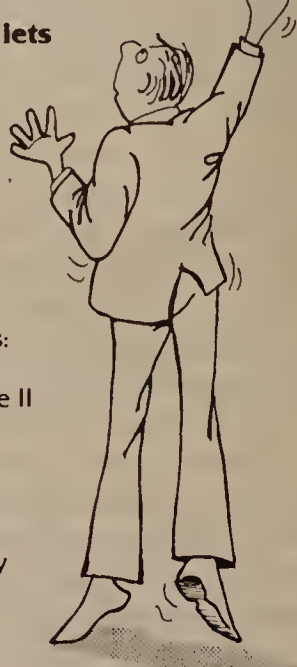
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CODE identifies the time span covered.

Data element: EMP-CLASSIFICATION-CODE.

Description: Identifies the type of employee. Examples are hourly (H), salary exempt (E) or salary nonexempt (N).

In summary, the original data element VAC-PAY-YTD-HR-EMP has been decomposed or modularized into these four data elements: EMP-CLASSIFICATION-CODE, TIME-PERIOD-CODE, PAY-AMOUNT and PAY-TYPE-CODE.

Why is it advantageous to decompose VAC-PAY-YTD-HR-EMP and create four separate data elements? Below is a discussion of the benefits of designing cohesive data elements.

A. Reduction in future maintenance costs. Using the above example, let us assume that John Doe is an hourly employee and is being promoted (or reclassified) to a salaried employee. Thus, we must change John's classification (EMP-CLASSIFICATION-CODE) from H to E, but we must also zero-out VAC-PAY-YTD-HR-EMP and move these wages to VAC-PAY-YTD-SAL-EMP.

We must change the contents of three data elements. If we had created the four separate data elements named above, we would only need to change the contents of one data element (EMP-CLASSIFICATION-CODE) from H to E.

The data element maintenance described above included changes to only one type of earning (vacation). If John Doe had several different earnings (sick pay, holiday pay, jury duty pay) on his employee record, this maintenance effort would increase significantly. Thus, by designing data structures composed of cohesive data elements, we reduce the future maintenance cost of data processing systems.

B. Reduction in total number of data elements. By designing highly cohesive data elements, we can significantly reduce the total number of data elements.

Using the example data element VAC-PAY-YTD-HR-EMP, let's demonstrate the difference in the total number of data elements based upon cohesive vs. noncohesive data element design.

Using the noncohesive approach, we must create separate data elements for each combination of earning

type and time period. Assuming that John Doe is an hourly employee, the following data elements would be required to store his necessary vacation pay information:

VAC-PAY-WTD-HR-EMP
VAC-PAY-YTD-HR-EMP
VAC-PAY-MTD-HR-EMP
VAC-PAY-QTD-HR-EMP
VAC-PAY-YTD-HR-EMP

If John had a total of 20 different pay types, we must

create and define in the data dictionary 80 data elements.

Using the cohesive data element design philosophy, we need to design and document only four:

PAY-TYPE-CODE

TIME-PERIOD-CODE
PAY-AMOUNT
EMP-CLASSIFICATION-CODE

Thus, the ratio between noncohesive and cohesive data elements is 80:4.

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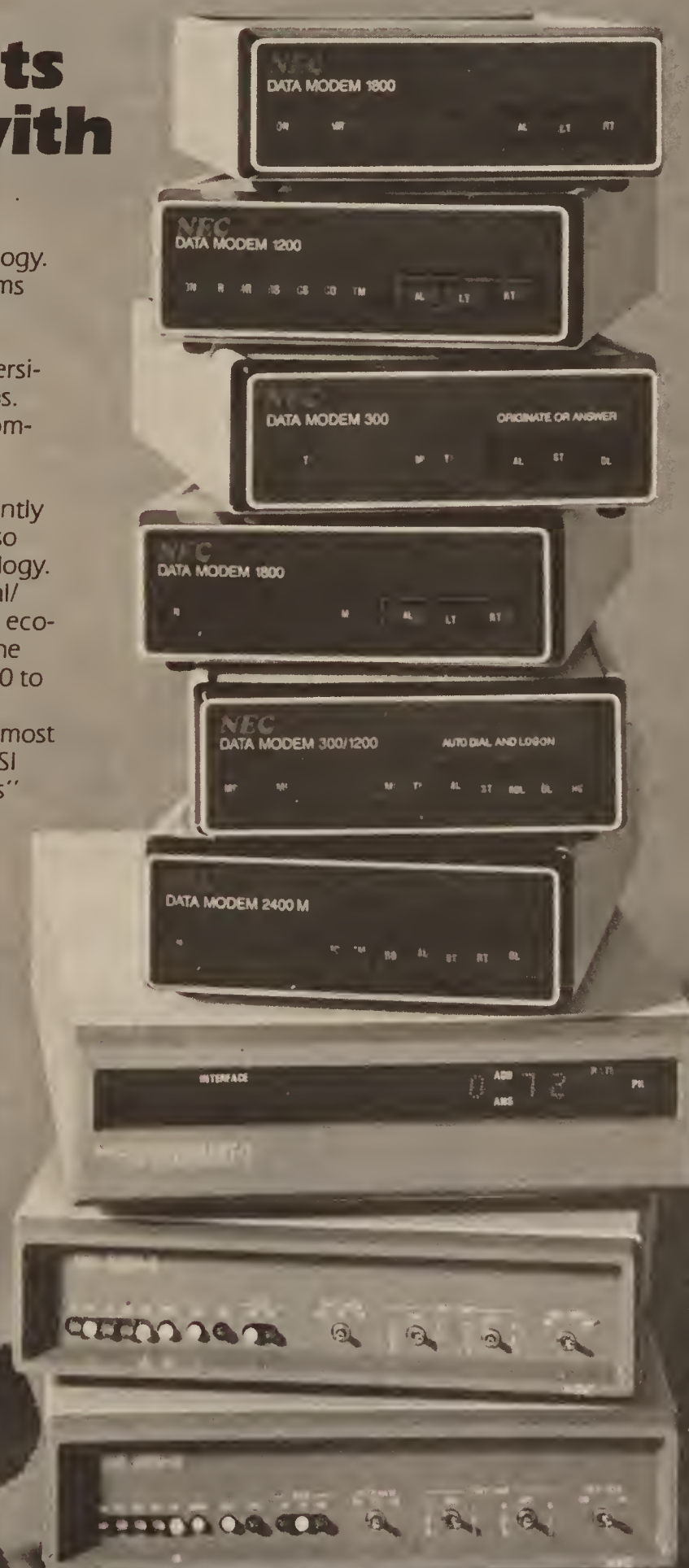
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or usefulness of data elements. The data element TIME-PERIOD-CODE is a highly cohesive, modular and effective data element. As demonstrated earlier, by designing this data element, we were able to reduce the total number of noncohesive data elements in the payroll system by a factor of 20. However, the data element TIME-PERIOD-CODE can also be used by any other nonpayroll system or program that needs a data element to indicate a time span.

Thus, by creating this cohesive data element and using it for all applicable programs and systems, there can be a significant reduction in the total number of data elements used in an organization.

D. Increase in the modularity or flexibility of the data design. By designing cohesive data elements whose domain or role (values) can be codified, we are increasing the flexibility or modularity of the data element. For example, the data element PAY-TYPE-CODE could have the following values: R = regular pay, S = sick pay, V = vacation pay and H = holiday pay.

Let us assume that a company decided that employees are now eligible for pay while attending the fu-

neral of a family member. If we had not designed the data element PAY-TYPE-CODE, we would have to create and document several new data elements to accommodate this change in company policy.

By using PAY-TYPE-CODE, we only need to add an extra value or role to this data element: B = bereavement pay.

In summary, it is important to consider the modularity or flexibility of data elements when designing systems. Unless systems and data bases are constructed from a foundation of cohesive data elements, the modularity or flexibility of the entire system will be compromised.

About the Author

William R. Durell is president and founder of Data Administration, Inc., a Cypress, Calif., company specializing in all aspects of information resource management.

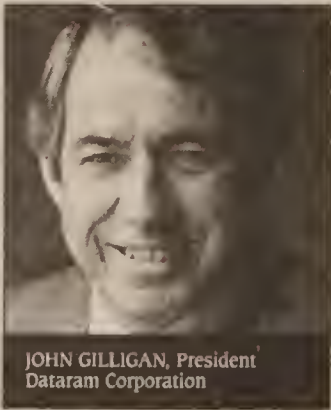
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A Checklist For Acquiring Applications Packages

By Dan Kamoji

The most judicious way to approach the process of acquiring an applications software package is to break the task into its four basic stages and develop a checklist of procedures for each part.

I. Developing acceptance criteria. The more thorough the work at this point, the easier and more successful the process of selecting and implementing the package. Acceptance criteria should be based on, but not limited to, the following considerations:

1. Describe the problem to be solved, the environment for the solution and the basic functions to be performed by the package. Express the problem in terms of inputs, calculations, outputs and volumes.

2. Specify what the package needs to do to solve the problem and what specific features the package needs to have. List hardware and operating system capabilities, file sizes and run times.

3. List required reports, file contents, inquiry capabilities, report generators, data base file structures (if applicable) and any other desirable features.

4. Specify required arithmetic capabilities. If you are looking at a payroll package, for example, make sure it meets with federal, state and local tax regulations.

5. Require that the package produce all essential reports and be designed so that new report formats can be developed easily to meet changing company needs.

6. List any applicable government regulatory procedures and agencies, legal requirements and industry standards that the package should accommodate.

7. Keep in mind that the package should be flexible enough to accommodate

fast-changing industry needs.

8. If applicable, specify multinational considerations, like foreign currency conversion capabilities and foreign currency editing requirements.

9. Require that the package be easy to install and use, allowing for easy set-up of new files and updates and maintenance to existing ones.

10. Spell out quantity and frequency of vendor maintenance. Mention any foreseen restrictions for vendor support.

11. List interface requirements for existing systems and procedures. Also note any interface requirements between the package and production libraries (source and object).

12. Describe any required special features, such as graphics output or special check formats or reports for one-time use.

13. If the package is required to have features for comparing budgets and so forth, specify them.

14. If the package must run both on the mainframe and smaller computers or multiple mainframes, state that requirement.

15. Describe hardware needs, including possible conversions.

16. Note any desired high-level programming language interfaces, program design and construction standards, documentation needs, service code availability, recovery/backup capabilities, transaction logging and auditing facilities and security provisions.

17. Write down file architecture, processing or turnaround constraints (response time).

II. Selecting the software package.

Many sources are available to assist in

IN DEPTH

the search for suitable vendors, including industry directories and research firms, computer and software journals, newspapers and magazines.

1. Narrow the number of vendors to be contacted by finding out which have packages that seem to suit your specific needs.

2. After reviewing the sources and selecting vendors to be contacted, send for product information. It may be helpful to attend one or more of the free seminars arranged by

What support will the vendor provide? How much on-site technical assistance is supplied under the vendor's standard contract? What specific qualifications will those support people have?

most vendors.

3. Review all vendor information thoroughly to determine which ven-

dors and packages most completely meet acceptance criteria developed during the first stage.

4. Eliminate vendors or packages that do not meet acceptance criteria in the most needed details.

5. While evaluating the packages, establish and weigh carefully how many of the acceptance criteria are fulfilled by each. Also note any information that exceeds the requirements.

6. Ask the questions listed below with reference to each package:

a) Does the basic function of the package meet your needs? Are its capabilities consistent with the requirements of your application?

b) Is a version of the package available for use on your make and model of computer? How much core storage is required? How many disk drives, tape units, card readers and punches and/or printers? Which models of each?

c) What are the software requirements? Will it interface properly with your I/O control routines and other related software facilities?

d) Can it produce the reports you need?

e) Is its performance adequate?

f) How flexible is the package? Are its input, output and processing capabilities flexible enough to accommodate changing requirements? Does it include I/O and computational capabilities beyond present needs?

g) In what form is the package delivered?

For security reasons, some packages are marketed only in object-language form. Whenever possible, a source deck and source-language listing should be acquired.

h) How difficult will installation be? What changes will need to be made in existing systems, procedures and forms? How many people will be affected, and what type of training or orientation will they need?

i) Will the package be easy to use? Is it designed for straightforward operation on your system, with well-documented operating procedures? Are the input forms and instructions for preparing them clear and efficient?

j) Is adequate documentation provided?

k) What support will the vendor provide? How much on-site technical assistance is supplied under the vendor's standard contract? What specific qualifications will those support people have? What is the cost and availability of additional assistance if required?

If you are going to be under maintenance contract with the vendor, you may limit the extent of changes you make to the package.

However, when considerable backup from the vendor is necessary, specify ahead of time a delivery or support date for fulfilling the changes needed. You should get a realistic estimated date from the vendor. To verify how realistic that "promised" date is, ask the vendor how many programmers or analysts or technical staff it is assigning

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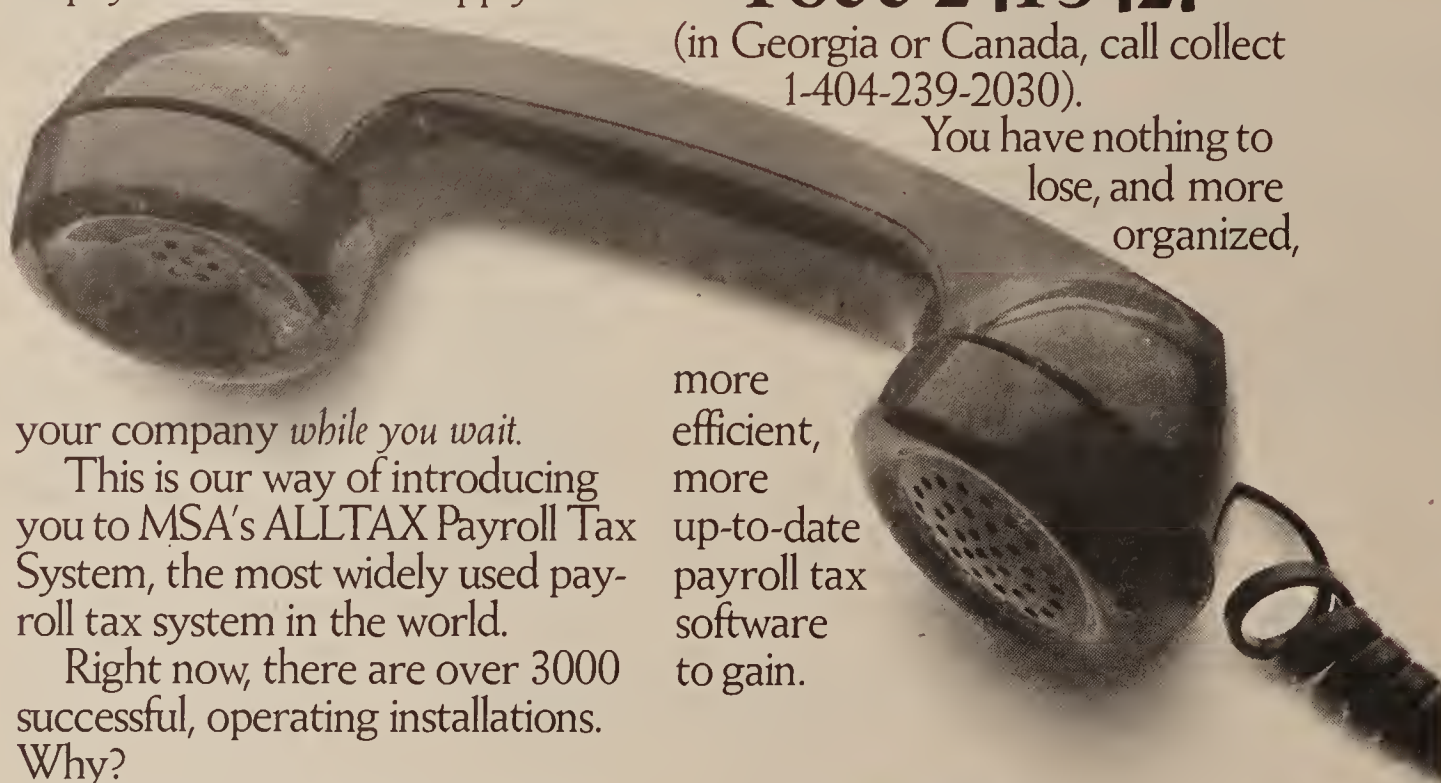
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IN DEPTH

to support your company's requirements.

l) What is the operational status of the package? When, where, by whom and for what purpose was it originally developed? When was the first user installation completed? How many companies are currently using the package?

m) What is the total cost of acquiring and using the package? This figure should include both the direct cost (that is, the price of the package itself) and the indirect costs that may be incurred in modifying the package to fit your requirements, changing existing systems and procedures, training personnel, converting files, installing and checking out the package, operating the package on a production basis and maintaining it after installation.

n) What financial arrangements are offered? Is the package available for outright sale, lease or both? What are the specific terms and conditions for each plan?

Are there any objectionable constraints upon use or modification of the package or upon the sale of services based on its use?

7. Be sure that the vendor's people will be readily available to keep the system up and running over the long term and that they will keep the package up-to-date with necessary enhancements.

In this connection, the vendor's maintenance policy and warranty, not only in regard to the package being considered but in regard to new releases and enhancements, should be reviewed.

8. Examine carefully what kind of initial and continuing education the vendor provides and at what cost. The training should be available on all levels, from introductory to advanced, for users and technical personnel.

9. Contact other users of the package to check on the quality and response time of the customer service department.

Check with the vendor about the hours of the department, whether knowledgeable personnel will answer the phone and whether service people are on call.

10. Meetings should be arranged with other user groups to discuss merits and faults of the applications packages. Such groups should consist of end users and data processing personnel. The existence of an active, growing user group indicates that the vendor is responsive to user needs.

11. The package and vendor should have good user references. Through these references, package performance can be measured in a production environment. The vendor may provide some names of users or user groups. But other users and groups should also be contacted to provide a more accurate evaluation.

The following questions may be included as a checklist when solicit-

ing information from current users:

a) When was the package installed?

b) How long did it take to get the package up and producing?

c) Does the package function as the vendor promised?

d) What are your experiences with the vendor's service department?

e) How is the documentation?

Ask other specific questions about the limitations, delays, errors and

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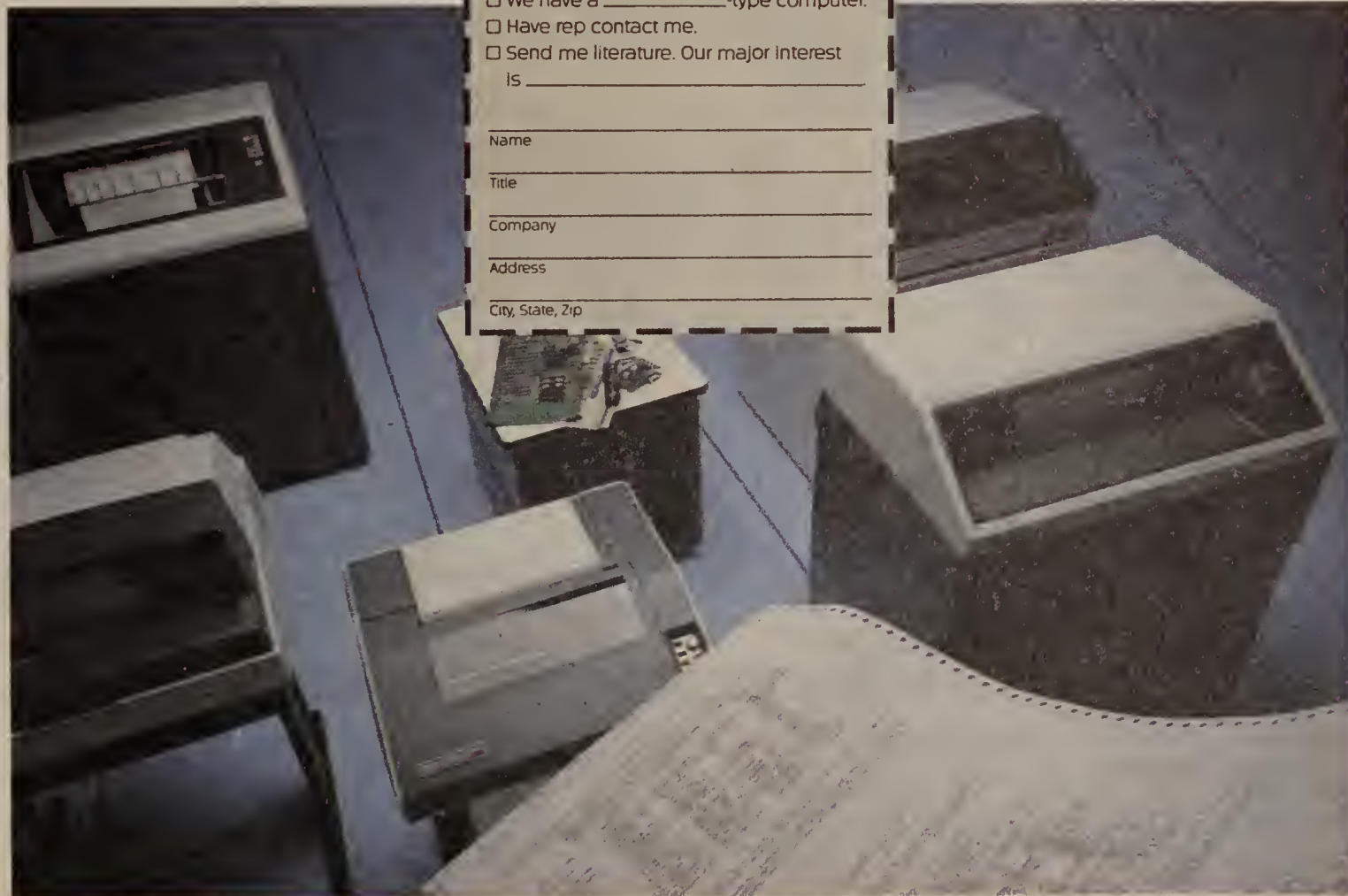
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A BUYER'S CHECKLIST

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IN DEPTH

any other problems they have encountered:

- a) What in-house modifications were required?
- b) How much assistance did the vendor supply?
- c) How could or should the package be improved?
- d) What is the overall performance and throughput level?

If possible, visit the user site(s) to see the package in a production environment. A visit also gives you a better feel about the users' response to the package and the vendor.

12. Check to see whether the vendor location nearest you has technical staff or only sales representatives.

13. Check the vendor's financial stability. Obtain a Dun & Bradstreet Co. report or a financial statement.

14. Get an idea of the range in the vendor's product line. If the company supplies a complete range of software packages, you may benefit if you intend to automate other functions. Packages from the same vendor often have a consistency in approach and often interface with each other. This feature is significant in cases where a change in one application considerably affects other areas. Price discounts are often available if multiple packages are purchased from the same vendor.

15. Make sure that you receive the most up-to-date package release available and that future enhancements will be made available. Also make sure that if modifications are needed, the vendor will assist your technical staff in identifying and making necessary changes and that this provision will not affect future support.

16. Consider the many variables in analyzing costs. The terms of the lease, terms on expiration of the lease, price of installation and costs of each of the services supplied should be carefully analyzed and compared with other packages and vendors. During cost analysis, the following questions should be asked:

- a) What price structures are available?
- b) What is included in the purchase or lease price?
- c) Is there additional cost for multiple installations?
- d) What is the length of the warranty?
- e) Is there a cost for maintenance during and/or after the warranty period?

f) Are there additional costs (manuals, support, improvements, training)?

g) What costs are associated with future hardware upgrades?

17. Ask the vendor and

the user groups about the limitations of the system.

18. If we are interested in a specific function, we should not only ask the vendor "Does the package do it?" but also "How does the

package do it?"

19. If a package does not meet a few criteria but is good enough in all other respects, discuss with the vendor the significance of those items and whether or not the

package can be modified to fulfill those few particular criteria.

20. Consider the feasibility of preparing and running benchmark tests on your own system. The tests are a



very convincing way of assuring the suitability of a package. However, designing a really meaningful test, preparing the input data and evaluating the results can be an expensive, time-consum-

ing process. The benchmark test may be waived in cases where the package is widely used and has received strongly positive references from its users or user groups.

Conducting benchmark

tests on your own computer may prove costly. The vendor may provide demo systems or a site for benchmark tests. However, there should be some evidence of how the new package functions.

21. Draw up a memorandum with a summary of the different packages evaluated and the reasons for selecting the particular package and vendor. The selected package should perform the nec-

essary functions and satisfy your acceptance criteria. Be sure to consider not only the cost of the package itself, but all the accompanying indirect costs: modifications, installation, conversion, training, maintenance, documentation, machine time and so on.

22. Finally, choose a package.

III. Developing a contract. Contracts with the vendors of software packages are usually preprinted affairs and may be similar from vendor to vendor. However, when the vendor makes certain promises as to the package's capability and its support, you should ask him to put them in writing, and those clauses should be included in the negotiated contract with financial penalty for nonfulfillment.

You need a contract especially for those occasions when something goes wrong. There is no substitute for a contract that clearly and specifically sets out the responsibilities, requirements, obligations and resources of each party, stipulating what will happen in case of breach of promise.

You should establish what the reasonable tests are with respect to installation, up-time, crashes, response time and the like.

The process is difficult if the salesman whose commission is at stake does the negotiating. If possible, he should not be one of the principal negotiators.

The contract should place full liability for costs and lost profits on the vendor.

A contract for the selected package should be developed and refined to reflect both the user company's and vendor's needs. The contract lawyer for your company should be encouraged to

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In Depth/39

A BUYER'S CHECKLIST

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The effort required to install an application software package successfully should not be underestimated: developing interfaces, making decisions on options, training, developing and implementing manual support procedures all fall in the installation stage.

play an active role in this process. The contract should be signed only after his approval.

While drafting a contract, the parties should include a clause or a paragraph pertaining to each of the items mentioned below, as appropriate and feasible:

a) What are the specific requirements or expectations for the package?

b) What are the performance levels to be achieved after the package is installed and in full operation?

c) What, if any, extraordinary specifications must the package meet?

d) What are the purchase or lease or license prices?

e) What are the payment terms? Present these in table or list form.

f) What are the warrant conditions?

g) What, if any, waivers are there, and if they apply only in specific circumstances, what are those circumstances?

h) What financial penalties will be levied for nonperformance of the package? If the package fails to perform as specified by the vendor or agreed upon by your company, not only should the vendor agree to rectify the weakness, but also financial penalties should be levied on the vendor for the existence of the weakness, as well as for the vendor's delay in rectifying it beyond a reasonable period of time.

If the vendor fails to provide adequate and timely support for maintenance needs that may arise in the future, financial penalties should be specifically levied.

i) What method will there be for terminating the contract? If the contract is terminated because of nonfulfillment of the contract by the vendor, the payment of the penalty levied on the vendor should be ascertained before the contract is terminated.

j) Not only should penalties be levied on the vendor for failure of the package or for failure to offer support or to meet other contractual obligations, but also the penalties should be specified for each period (a day, a week and so on) during which such failure or nonfulfillment extends.

k) Whenever possible, source code should be obtained along with object code with reference to the package selected.

l) The requirements of both emergency and ongoing vendor support should be specified.

m) Conditions for vendor-supplied training and documentation

not only at the time of purchase but on an ongoing basis, including enhancements, should be mentioned. Financial penalties may be specified for failure to meet such conditions.

n) Every module of the software package being leased should be listed. Program names should be specifically mentioned. Specific manuals of documentation, processing of flows, operational documentation, all processing documentation, should be listed by name.

o) Delivery date(s) should be mentioned in the contract. Financial penalties should be levied for failure to meet the delivery date.

The penalty should specify amount to be paid per specified period of time after the delivery date has passed.

Support dates and software fix dates should be stipulated in the con-

tract (within how many hours or days after the vendor is notified of the problem will it provide effective support and/or carry out the necessary software changes). Financial penalties should be levied on the vendor for failure to fulfill such a need for support.

p) If necessary, the contract should contain a clause stating that the most recent release will be delivered.

q) Specify all ownership rights.

r) Establish what would happen if the vendor went out of business.

s) Specify the amount of installation assistance, including training, you expect from the vendor. The more the vendor is involved, the better.

t) Especially in cases where it can be proved that profits were lost because the vendor's package failed to perform as promised or because the vendor's support did not meet the deadline as agreed beforehand, the losses so incurred should be directly passed on to the vendor. In other words, the contract should provide for reimbursement from the vendor in cases of failure or delay in performance.

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IN DEPTH

conducting a postinstallation review. Thorough test procedures should be specified to ensure that the installation has been successful.

Make sure that the software is operating as it should after one full cycle, at least.

The effort required to install an application software package successfully should not be underestimated: developing interfaces, making decisions on options, training, developing and implementing man-

You should not let the vendor off the hook until the package operates at peak efficiency, has delivered bug-free results during at least one complete processing cycle and has been fully integrated into the overall operational environment.

ual support procedures all fall in the installation stage. This stage requires the close cooperation of the data pro-

cessing staff, vendor's installation team and users. If the process is skillfully handled, the rewards far out-

weigh the effort.

Depending upon the complexity of the package and the environment in which it must operate, the installation phase may take anywhere from one day to many months. The vendor will usually consider the installation complete when it has supplied the promised documentation, provided the agreed-upon training and succeeded in making the package run on your system.

However, you should not let the vendor off the hook until the package operates at peak efficiency, has delivered bug-free results during at least one complete processing cycle and has been fully integrated into the overall operational environment.

After the package has been operational for a while, a review should be conducted as to performance of the package as well as the vendor, not only with reference to the acceptance criteria initially formulated, but also with reference to the contract.

Application software packages generally result in more efficient use of operational and decision-making resources. This improvement usually results in cost benefits, but they are hard to quantify. The costs may also be compared against such benefits as improved clerical efficiency, quicker availability of information, cost avoidance and the specific advantages related to the application under review.

Check the results. A package can represent a significant capital expenditure and a vital cog in company operations. Its performance should be carefully measured to make sure the package is being used effectively and is delivering everything for which you bargained.

Any significant limitations or deficiencies in the package should be identified and plans made for overcoming them.

Finally, a report on the vendor's performance and reliability should be prepared and filed for future reference.

About the Author

Dan Kamoji is an information systems standards analyst with Merchants National Bank in Indianapolis.

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IBM Cuts Price Of 4701 Controllers, Increases Storage Of High-End 4701

WHITE PLAINS, N.Y. — IBM last week reduced the price of add-on storage for its 4701 Finance Communication System controllers while at the same time announcing it has increased the storage capacity of its high-end 4701 controller by 75%.

The price of the 128K-byte storage feature is \$1,250, compared with the two 64K-byte increments that listed for \$3,170. A spokesman noted that by adding the 128K-byte machine storage increments, 4700 users can increase the capacity of the 4701 Model 2 to 896K bytes — an increase of 384K bytes.

The base machine storage capacity has also been raised from 192K to 256K bytes, an IBM said.

The 4701 Model 1's base machine storage capacity remains at 192K bytes, the spokesman said. However, the device is available in storage configurations of 256K, 384K and 512K bytes. The Model 1 can be upgraded to a Model 2, the company said, with 256K, 384K, 512K, 640K or 768K bytes of machine storage.

The company also unveiled an adapter, called the X.21, that can be used with both switched and nonswitched networks.

First shipments of the 4701 Model 2, with more than 512K bytes of machine storage, are scheduled for December of this year.

Model 1 controllers, shipped after Sept. 20 of this year, must be configured with 192K, 256K, 384K or 512K bytes of storage. Existing orders for 320K- or 448K-byte machines will be shipped as 384K-byte or 512K-byte configurations, respectively, the IBM spokesman pointed out.

More information on the price reductions, as well as the memory upgrades and the controller, is available from IBM at 900 King St., Port Chester, N.Y. 10573.

Optical Firm Keeps Eye On Goods With DP Service

FLUSHING, N.Y. — An on-site, mini-computer-based computing service has helped a manufacturer and importer of ophthalmic eye wear to monitor inventory and improve its cash flow.

The Styl-Rite Optics (SRO) Group manufactures and imports eye wear under various brand names, producing about 100 different frame designs for distribution nationally to optical wholesalers, chain retail optical stores and optical laboratories.

These designs translate into as many as 1,400 separate units, manufactured at SRO's U.S. plant or imported, that must be controlled throughout the process — from manufacturing through order picking to distribution. To blur matters even more, a portion of SRO's approximately \$12 million in annual sales includes prescription lenses, which must also be tracked from order entry through distribution.

During the late 1970s, the privately owned company, located here, considered computerizing to monitor its inventory, sales and receivables. It looked for a way to computerize SRO's basic accounting functions without buying a computer.

But instead of either entering into a long-term lease or buying, SRO found another alternative to automation. It decided in mid-1981 to use a computing service, Automatic Data Processing, Inc. (ADP) of Clifton, N.J., partly because ADP made computer equipment available without requiring a long-term agreement and partly because the on-site, interactive business accounting system offered by ADP allowed SRO to see clearly what was happening to its business.

SRO went on-site with ADP in early 1982, after six months as a batch process payroll customer. The on-site system installed at SRO's headquarters consists of a minicomputer, five CRT terminals and two high-speed printers, which allows the firm to process data internally, yet have the data transmitted via dedicated phone lines to the regional ADP computing center for continual monitoring. Answers to the company's questions about accounts receivable or inventory, for example,

come back via terminal screens or hard-copy management reports printed at SRO's location.

Although the computing capacity for SRO's system is located at the regional ADP facility, the optical firm has memory storage capacity on-site of 5 million digits of data, which can be retrieved on a random basis. That kind of power gives the company virtually unlimited room to grow with the system, according to Jerome J. Pomerance, president of SRO.

During installation, ADP trained the SRO employees who would operate the system, avoiding the expense of adding clerical help to deal with business growth and hiring programmers as well. ADP has

(Continued on Page 78)

AM-1000 Version Offers Users More Memory

IRVINE, Calif. — Alpha Micro, Inc. has unveiled a version of its AM-1000 multiuser micro-based system said to offer users twice the memory of and increased disk storage over previous versions.

The AM-1000E reportedly offers 256K bytes, expandable to 512K bytes, and a standard 30M-byte, 5¼-in., high-speed Winchester drive for data storage. Additional Winchester disk subsystems may be added to provide up to 120M bytes of storage.

Other features include the vendor's proprietary Amos operating system; a 5¼-in. floppy diskette or the vendor's video cassette recorder option for backup; Motorola, Inc.'s 16/32-bit 68000 processor; three serial ports; support for up to seven users simultaneously plus a printer; and the ability to run Alpha Micro's Alphacalc spreadsheet and Alphawrite WP packages.

A basic version of the multiuser, multi-tasking system costs \$15,000 from Alpha Micro, Suite 4060, 2049 Century Park E., Los Angeles, Calif. 90067.

Multi-Micro CPU Architectures Examined

By Kevin Fischer

Special to CW†

For years, multiuser capabilities for computer systems have been touted for their potential contributions to productivity, return on investment in computer hardware and, in general, the ability to do more tasks with the same equipment.

The rapid decrease in the price/performance ratio of systems has not changed this viewpoint. In fact, the availability of low-cost computing resources has even spurred the development of new multiuser architectures, which are now yielding new highs in user performance at even more reasonable costs.

The first multiuser capabilities were successfully implemented in the mainframe world in an effort to distribute the resources and data bases of these costly machines to as many users as possible. By the mid-'70s, most minicomputers offered multiuser capability for considerably less investment per user than was available previously. And by 1980, multiuser capabilities were introduced on relatively inexpensive microcomputer-based systems.

'Problems can occur . . . when the demand for system resources exceeds the ability of a system to respond to user requests. . . . In fact, it is not unusual for a microcomputer-based, time-sliced system to come to its knees with the addition of just a third or fourth user to the system.'

All of these solutions were based on the use of time-sliced or time-sharing operating systems technology to achieve multiuser capabilities. In such systems, any single user has concurrent access to system resources with other users. Problems can occur, however, when the demand for system resources exceeds the ability of a system to respond to user requests. This creates excessive response time delays to task requests and, in general, defeats the whole purpose of multiuser systems in that users cannot get their tasks executed in a reasonable amount of time.

The response time problem becomes especially critical in lower cost, lower performance systems. In fact, it is not unusual for a microcomputer-based, time-sliced system to come to its knees with the addition of just a third or fourth user to the system.

Multiuser Solutions

The current widespread availability of low-cost microprocessor hardware and the attractiveness of multiuser capabilities have spurred a number of manufacturers to develop a variety of viable micro-based multiuser solutions.

These solutions involve the creation of new computer system architectures employing two or more microprocessors to share the work load and improve response to user requests without greatly increasing overall hardware costs.

Two basic multimicroprocessor architectural concepts are now evolving and are competing for market share. One concept is a loosely coupled architecture in which several microprocessors, each with

(Continued on Page 76)

DMA Cartridge Disk Drive to Target Desktops

GOLETA, Calif. — DMA Systems Corp. has announced that Comdex — to be held in Las Vegas Nov. 28-Dec. 2 — will be the forum for the introduction of the new DMA 360, a removable, half-high, 5¼-in. Winchester cartridge disk drive for desktop and personal computers.

A company spokesman said the DMA 360 will offer increased system reliability and data integrity in addition to improved access times and transfer rates over floppy disk drives. DMA said the device will feature a 7.5M-byte Ansi-standard Winchester disk cartridge and will offer an average access time of 98 msec. Error rates will be equal to those of conventional Winchester disk drives.

The company said DMA 360 will include a 30-sec purge cycle and an extensive air filtration system along with fully retracted heads that are

dynamically loaded. The spokesman said the device will offer users the reliability associated with conventional Winchester disk drives as well as the convenience of removable media.

The product is also expected to feature on-board microprocessor firmware that permits users to format

a blank cartridge when it is inserted into the drive. Once formatted, these cartridges will be interchangeable with all DMA 360 drives. The DMA 360 will offer a pull-out top drawer and an angular, spring-loaded sleeve for disk loading and cartridge positioning. It will be compatible with the standard ST506 interface, form

and power requirements.

The DMA 360 is scheduled for evaluation-order shipment in the first quarter of 1984 and will be priced at \$500 in OEM quantities, the firm said.

More information is available from DMA Systems, 601 Pine Ave., Goleta, Calif. 93117.

Telex 286F Tabletop Daisywheel Unveiled

TULSA, Okla. — Telex Computer Products, Inc. has announced an 80 char./sec daisywheel tabletop printer said to feature letter-quality printing and interchangeable print wheels.

The Telex 286F printer reportedly accommodates both plastic and metallized print wheels with either 127 or 96 characters. The bidirectional

unit is plug-compatible with IBM's 3287 and attaches to either a Telex 174, 274C or 276 or an IBM 3274 or 3276 controller.

The printer's operator console

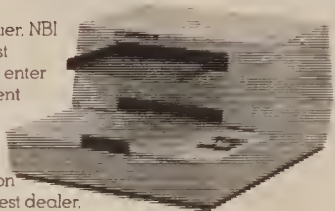
configures line spacing of six or eight line/in. with 10 or 12 char./in.

The Telex 286F is priced at \$5,350 from Telex, 6422 E. 41st St., Tulsa, Okla. 74135.

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Victor 9000 Newsletter Available

ATLANTA — A newsletter for users of Victor Technologies, Inc.'s personal computer, the Victor 9000, began publication here in September.

"Sivic-9000" reportedly includes features on new software and hardware releases, user re-

views, interviews, articles describing user installations and other articles.

Charter subscriptions are available for \$24 a year from "Sivic-9000," which is located at Suite 456, 3277 Roswell Road N.E., Atlanta, Ga. 30326.

Examining the Concept Of Multiuser Architectures

(Continued from Page 75)

its own dedicated memories, are linked together over a high-speed communications bus.

Second Concept

The second is a closely coupled architecture in which each of several microprocessors shares a portion of a common memory bank.

Both architectures employ a mas-

ter/slave scheme, where one processor is dedicated to handling system resources and overhead, such as disks, printer and communications links, while the others process individual user tasks. Since "slave processors" are freed from system overhead, their performance approaches that of a single-user system.

However, similarities between the two architectures end here, with the closely coupled architecture yielding significantly higher throughput and performance than the loosely coupled alternatives, primarily because of the functional differences in inter-processor communications.

Loosely Coupled Designs

For example, in loosely coupled designs, individual tasks are commonly downloaded from the master processor to the slaves via the communications bus.

This communication, no matter how efficient, delays actual task execution significantly over that encountered in a closely coupled architecture in which interprocessor communications is accomplished through simple block memory moves from master to slave or redefinition of the slave memory addressing boundaries. Usually both of these operations can be accommodated in a few memory cycles.

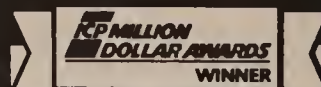
Since closely coupled architectures eliminate both the need for complex bus contention electronics and the duplication of many large memory banks throughout the system, they cost less to build and, therefore, deliver the best price/performance ratios for the two alternatives.

Fischer is vice-president of engineering for Compupro Corp., Oakland Airport, Calif.

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Benetics Offers Micro-Based Turnkey System

MOUNTAIN VIEW, Calif. — Benetics Corp. has introduced Charlie, a turnkey health care claims administration system that the company said delivers claims processing capabilities on a microcomputer that were previously available only on mainframe systems.

Using a version of the Unix operating system commercially adapted to provide superior performance for I/O-intensive operations, the system includes Benetics' custom-designed claims ad-

ministration software, a Zen-tec, Inc. 8000 terminal and a Plexus Computers, Inc. P/60 supermicrocomputer. The company said the elements of the system provide fast, block-mode, multiuser claims processing and data analysis capabilities.

The system is said to be aimed at third-party administrators, self-insuring organizations and commercial insurance companies that need

to automate the paper-intensive process of keeping files on employees' health care claims.

The Plexus P/60 is equipped with an Motorola, Inc. 68000 CPU and a Z8000 disk controller, plus an additional Z8000 I/O controller for every eight terminals. The company said it developed an application monitor for Unix, which was designed to provide reliability

and ease of operation by non-technical users. The claims processing software is written in the C language.

The company said the software's windowing features allow data entry, file research and instruction screens to be displayed on the screen simultaneously. Charlie is reportedly capable of increasing the productivity of claims examiners by at least 100% to 200%, and the

data collection capabilities are said to provide more information on which to base long-range cost containment decisions.

The system is available with installation, training and support at prices beginning at \$175,000. More information is available from the vice-president of sales and marketing, Benetics, 335 E. Middlefield Road, Mountain View, Calif. 94043.

Firm Targets Apple Micros With CAD-1

NEWTON, Pa. — Chessell-Robocom Corp. has introduced the Robographics CAD-1 computer-aided design (CAD) system for use with Apple Computer, Inc. Apple II+ and IIe microcomputers.

The CAD-1 reportedly produces scaled, technical drawings and custom graphics, such as building plans, mechanical drawings, schematics and flowcharts.

A complete turnkey configuration including plotter is available starting at \$4,920 and is said to emulate CAD installations costing over \$15,000. Features include a precision hand-held controller to draw to exact dimensions.

The CAD-1 software only, including controller and user manual, costs \$1,095. Chessell-Robocom is located at Suite 2B, 125 Pheasant Run, Newton, Pa. 18940.

Versatec Out With Printer

SANTA CLARA, Calif. — The Versatec, Inc. V-80 printer can be used as part of an engineering or graphics workstation with the IEEE-488 interface from Versatec.

The V-80 prints bills of materials, schedules and listings up to 1,000 line/min on roll or fan-fold paper. It permits plotting of data formatted for 100 or 200 point/in., printing of up to 256 characters, character underline and a selection of character sets and fonts. The V-80 can replace an impact printer and pen plotter and can serve as a shared-output device for a network of IEEE-488 stations.

The IEEE-488 interface is mounted on a single printed circuit board and comes with a 2.5-meter cable. OEM prices begin at \$7,444 from Versatec at 2710 Walsh Ave., Santa Clara, Calif. 95051.

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Mohawk 21/10 Gets More Memory, SDLC

PARSIPPANY, N.J. — Mohawk Data Sciences Corp. has announced several enhancements to its Series 21 single-station distributed data processing system, the Model 21/10, including in-

creased memory, Synchronous Data Link Control (SDLC) communications and an 80 char./sec printer.

Memory enhancements include a doubling of main memory to 256K bytes and

the addition of 5M to 15M bytes of fixed disk storage. In addition, double-sided, double-density diskettes with 1M-byte capacity allow the single-station user to compile with high-level lan-

guages formerly available only on disk-based multistation systems.

The 21/10, which formerly offered only byte-level asynchronous and bisynchronous communications channels, now also allows use of SDLC bit-level communications protocol. SDLC offers reduced turnaround time, inherent conversational mode, total data transparency and full-duplex capabil-

ities, the firm said.

The 80 char./sec printer is a dot matrix model with a 96-char. graphics set. The single-station system also supports 40, 45 and 120 char./sec printers.

The Series 21 single-station distributed system ranges in price from \$6,000 to \$20,000 from Mohawk Data Sciences at 7 Century Drive, Parsippany, N.J. 07054.

Optical Lens Site Uses DP Service

(Continued from Page 75) continued to provide system monitoring, software updating, maintenance and diagnostic support when necessary.

"One of our major concerns was to have as smooth an installation as possible," said Ray Hyman, SRO's executive vice-president. "We are a service-oriented business, even though we're a manufacturer, and we cannot afford an interruption in that service. A service firm itself, ADP understood our needs."

SRO processes between 200 and 250 invoices every business day. Prior to the ADP system, all invoicing and inventory processing was done manually, using automated billing machines and a battalion of clerical help. "Before we went on the ADP system, there really was no good way of telling how long it took to process an order completely," Pomerance said. "Now I'd say that the picking of an order alone is 40% to 50% faster, and we're able to number sequentially the items picked. Record keeping and inventory control in our business, being a quasi-medical industry, is very important," he added.

Because an invoice does not necessarily produce payment within 30 days — customers pay within the range of 30 to 75 days — SRO requires help with its accounts receivable. On the second work day of the month, SRO statements, which average 1,700 monthly, are mailed out, offering an early-payment discount incentive. This discount, built into the ADP system, has been responsible for improving the company's cash flow.

SRO also receives a series of monthly and weekly management reports that provide the company and its sales force with insights into customer activity.

"We really feel that everything promised was delivered. The training was first-

class. Our people were guided through the system expertly. And we were sur-

prised at the ease with which the system was installed," Hyman said.

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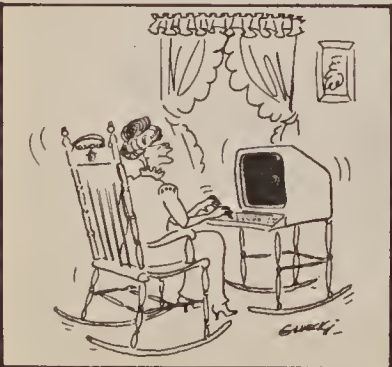
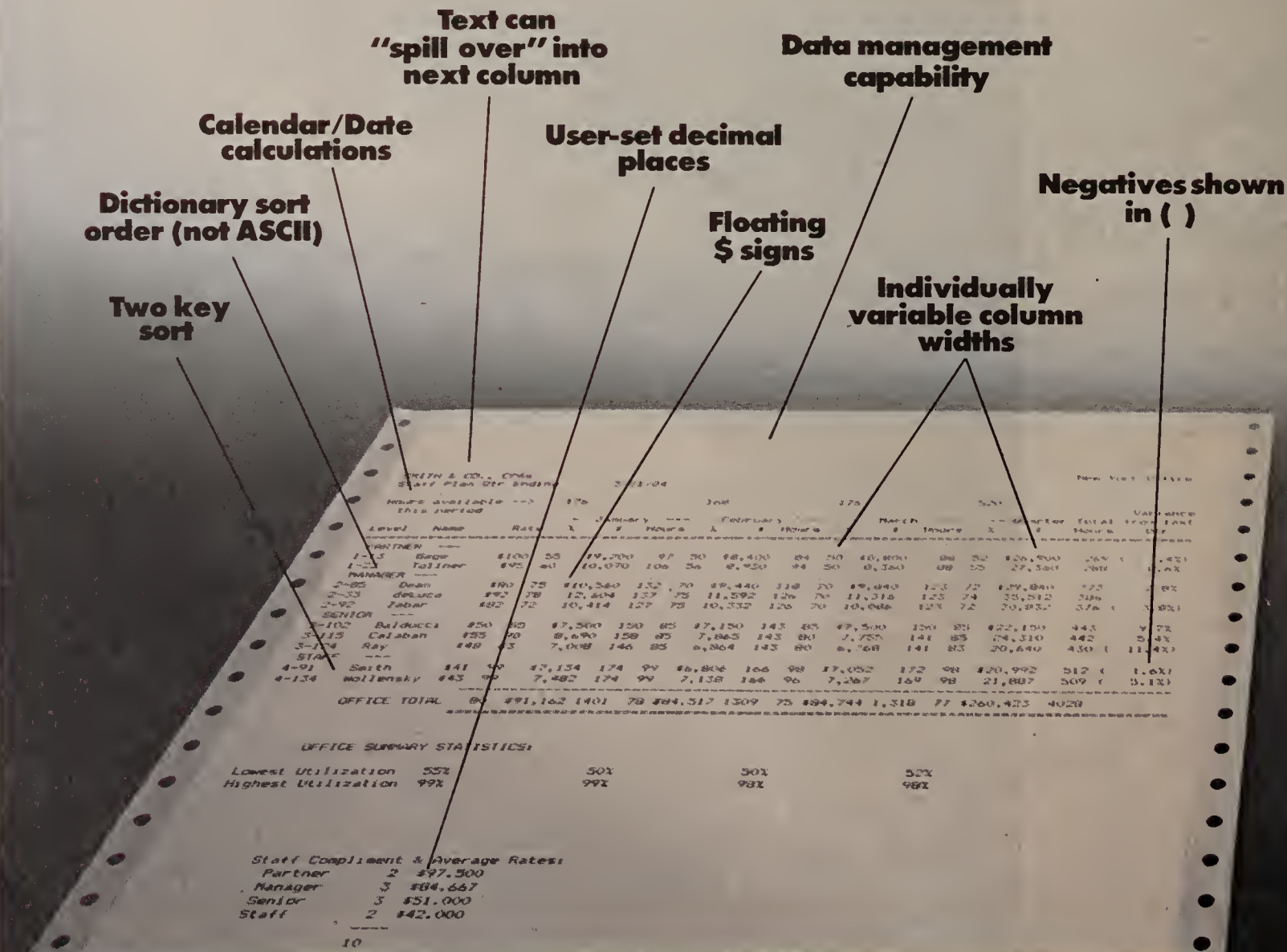
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Winnie Disk Option Backs TI Professional Computer

DALLAS — Texas Instruments, Inc. has announced a 10M-byte Winchester disk option for TI's Professional Computer that doubles users' data and program storage capabilities.

The 10M-byte disk reportedly is compatible with the 1.25 version of Microsoft, Inc.'s MS-DOS operating system and fits inside the system unit.

Suggested retail for the 10M-byte Winchester is \$2,295 and includes both the controller board and diagnostics software package. A limited quantity of the 5M-byte disk currently being used with the system is also available at the reduced price of \$1,795.

TI can be reached through
P.O. Box 402430, Dallas, Tex-
as 75265.

Built Around NS16032 Chip

GOLDEN, Colo. — Unidot, Inc. recently announced a high-speed central processor built around a National Semiconductor Corp. NS16032 chip and designed for high-performance users in an Intel Corp. Multibus environment.

The Unidot UB3050 was designed with 8K bytes of cache memory with an access time reported to be 45 nsec.

The NS16032 has full 32-bit internal arithmetic and an instruction set suitable for higher level languages, a Unidot spokesman said.

The Intel Multibus interface provides support for up to 16M bytes of memory using 24-bit addressing and will also accommodate smaller systems with support for 16 and 20 bits.

Other features include

two asynchronous/synchronous serial ports with RS-232C interface, battery-backed time-of-day clock, programmable real-time clock, memory management unit, floating point processor and up to 32K bytes of programmable read-only memory.

Single board price is \$3,995. Further information is available from Unidot, Suite 231, 602 Park Point Drive, Golden, Colo. 80401.

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Micro Entry Designed For Credit

ATLANTA, Mich. — Creditor Resources, Inc. (CRI) has announced the release of the Loan-Pro 1000, the latest in its series of microcomputer systems designed for credit unions.

The Loan-Pro 1000 system is said to feature an OSM Computer Corp. Zeus multiprocessor microcomputer, which is expandable up to 128M bytes of high-speed disk storage and capable of providing up to 32 separate terminal users access to a wide range of software.

A typical Loan-Pro 1000 system consists of four terminals, one printer and one communications port with word processing, spreadsheet and Loan-Pro software. It costs \$765/mo, including installation, staff training and maintenance. CRI is located at Suite 717, 4350 Georgetown Sq., Atlanta, Ga. 30338.



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Configuration Options Out For APS-Microcomposer

NEWBURY PARK, Calif. — Autologic, Inc. has announced several configuration options, including a 120M-byte disk storage device, to enhance its APS-Microcomposer.

Autologic said disk storage may be selected in configurations providing three 20M-byte disk storage units for a total of 60M bytes on-line or three 40M-byte disk units for a total of 120M bytes. APS-Microcomposers installed with 40M-byte disk storage can be increased with either a 20M-byte or 40M-byte disk storage attached to the base unit, and APS-Microcomposers installed with 20M-byte disk storage can be increased with a 20M-byte unit.

The vendor also announced a streaming tape drive for archival storage and a circuit board designed to convert a workstation into a preview monitor.

Each 20M-byte disk storage unit is priced at \$10,000 and the 40M-byte unit at \$17,000. The magnetic streaming tape drive, with controller, is priced at \$10,750, and the preview option board is priced at \$2,500. More information can be obtained from Autologic, 1050 Rancho Conejo Blvd., Newbury Park, Calif. 91320.

Debut of 2187A Expands Family Of Intel RAMs

SANTA CLARA, Calif. — Intel Corp. has introduced the second product in its family of integrated random-access memories (RAM).

The 2187A 64K-bit integrated RAM is a high-density random-access memory organized as 8,192 words by 8 bits. Designed for synchronous applications where arbitrary wait states or system delays are not allowed, the 2187A features a refresh row-address counter and multiplexer on the chip, a power-down automatic refresh mode and extended cycle operation, Intel said. It includes access times of 250, 300 and 350 nsec.

The price of the 2187A integrated RAM is \$19.95 in quantities of 1,000 from Intel's Literature Department at 3065 Bowers Ave., Santa Clara, Calif. 95051.

Micro Offered With Winnie For 100% Backup

HUNTINGTON BEACH, Calif. — Advanced Digital Corp. (ADC) has announced the Super Star microcomputer system, an S-100-based system with a removable cartridge Winchester drive providing 100% backup.

With the removable cartridge, the user reportedly can store data equaling 50 floppy diskettes on one 5¼-in., industry-standard 5M-byte cartridge, a spokesman for the company said. Combined with Super Star's standard 5M-byte fixed Winchester drive, they provide 10M bytes of on-line storage and backup, according to the vendor.

Super Star's features include Digital Research, Inc.'s CP/M operating system, expandability and service for up to four or more users, a 48 track/in. floppy disk drive and switch-selectable 110V/220V power supply, the vendor said.

In a single-user application, Super Star's suggested retail price is \$4,800. For multiuser applications, the vendor's Super Slave single-board slave processors are priced at \$575 each, according to the spokesman for the vendor.

ADC is located at 5432 Production Drive, Huntington Beach, Calif. 92649.

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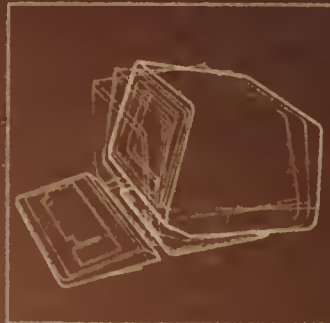
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Implications Changing Industry

De Facto Standard Propels Micros

By Stanley S. Shein
Special to CW†

The microcomputer revolution is even more revolutionary than was the introduction of minicomputers.

What's revolutionary is that the vast majority of the microcomputer manufacturers decided to design their computers to use the same operating system — Digital Research, Inc.'s CP/M — thus creating a de facto standard. For the first time, a user can take a program out of one computer and put it into another as easily as moving a cassette tape from a car stereo to a home stereo. The implications are already changing the industry:

- We can afford to write a really good piece of software for \$100,000 and sell it for as little as \$1,000 if we know we have the chance to sell it many times.

- Virtually all of the non-

conforming manufacturers have announced that they either will have CP/M models or they will sell a board to allow users to run CP/M on their micros.

- Anyone who buys (or owns) a small computer using a proprietary operating system has an Edsel on his hands.

Probably the most important single upheaval is the universal operating system CP/M. It makes it possible to buy and maintain entire software systems for a fraction of the total cost of development and maintenance and to create a mass market for the creation, publishing, distribution and evaluation of thousands of new software products.

The micro revolution means several things:

- Ease of installation. First-time users can be up and running in a few days.

Training is minimal since the programs are very tutorial (user friendly). Companies already operating large computers often face add-on expenses in excess of \$100,000 and installation periods of a year to install a new application that can be done overnight on a micro for as little as \$15,000.

- Makes hardware a commodity. Given its small size and a standard operating system, computer hardware now becomes a commodity with interchangeable components. It is now possible (really preferable) to buy a computer system as one hitherto bought a stereo — getting the best terminal, printer, central processor and even the best software for each application.

- Maintenance. Thanks to reduced size and interchangeability, the field service staff can actually swap out the offending terminal or central processor with another unit, using only a screwdriver, and have the user up and running in a matter of minutes (not so with minis or mainframes).

- CP/M limitations. Apple Computer, Inc.'s Apple and Radio Shack's TRS-80 are 8-bit personal computers with limited software and hardware capabilities. Large, well-known computer companies such as IBM and DEC have gone to great pains to limit the capabilities of these personal computers to avoid displacing their own proprietary-based, more profitable minicomputers. CP/M effectively makes the computer a commodity. The big computer manufacturer doesn't like this and continuously tries to keep the customer locked into a particular computer. The proprietary approach utilizes operating systems and other software to accomplish this.

CP/M is a single-user system. MP/M (also from Digital Research) provides a limited multiuser capability of two to three users.

However, there are CP/M-compatible multiuser systems — including systems with up to 15 terminals, 300 million characters of disk with tape backup — which out-perform minis costing \$40,000 more and utilizing CP/M software.

Until recently, Unix usage was confined to larger computers. The exploding availability of 32-bit supermicros will allow current users of large minis and mainframes to get new computer systems at only slightly higher costs than CP/M users pay.

Shein is president of Management Techniques, Inc. in Boston.

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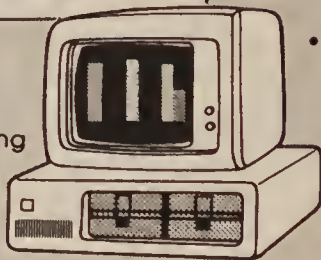


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Voice Messaging Seen Increasing in Popularity

(Continued from Page 83)

won't be there," Wang said.

Current manual messaging systems are seldom used to their fullest potential today because people do not trust humans to take messages accurately, Plotzke said. "Only 9% of the people leave a complete enough message to let the receiver take some action without calling back," he said, citing an AT&T study.

The same study revealed that "voice mail can displace 12% of paper mail received today," Plotzke said. Both also warned that users may begin to overuse a voice mail system and hinder productivity as well as enhance it.

Another issue in voice messaging is that it infringes on the DP department's territory.

"You're going to have to integrate the two departments," according to Plotzke.

While this new technology is aimed at increasing productivity, Plotzke said that the AT&T study found it impossible to measure productivity accurately.

The only measure that Plotzke said is useful is that of production time, pointing out that "if [Revlon, Inc.] can make a lipstick in six months instead of nine, they have achieved a gain in productivity."

Plotzke said that his voice messaging saves him an hour per day and will save most people half an hour per day of telephone conversation.

Interleaf Unveils OPS-2000 System For Publishing

(Continued from Page 83)

The system includes a laser printer with graphics controller and a Motorola, Inc. 68010 microprocessor-based workstation with CRT terminal. The printer reportedly operates at 10 page/min, and the workstation itself is said to include 1M byte of main memory, a 31M-byte Winchester disk drive, a 20M-byte streaming cartridge tape drive and a bit-mapped screen displaying black on white with a resolution of 800 by 1,000 pixels. The system also includes a cursor-driving mouse.

The Interleaf terminal, keyboard and mouse are provided by Sun Microsystems, Inc. of Mountain View, Calif., and the printer is from Imagen Corp., also of Mountain View, according to a vendor spokeswoman.

OPS-2000 can produce documents of up to 1,200 pages, while providing the user with the capability to receive printed output at any time during the editing process, the spokeswoman said. Documents can reportedly contain text in multiple typefaces and type sizes, numerical data in tabular form, business charts and diagrams drawn on the screen.

The system features automatic pagination and a document editor said to enable a user to change the format of a document by issuing single commands.

Graphics functions in the software include data-driven business graphics such as pie and bar charts.

Available 30 to 60 days after receipt of order, the OPS-2000 is priced at \$60,000. More information is available from Interleaf at 955 Massachusetts Ave., Cambridge, Mass. 02139.

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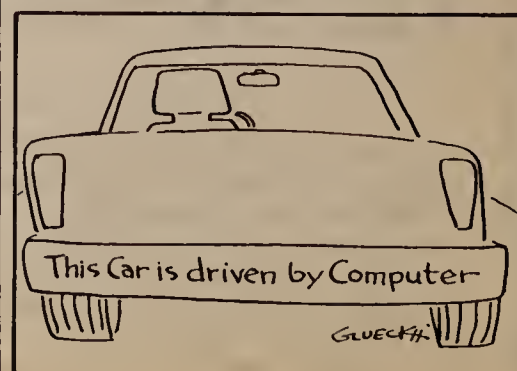
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Ethernet Gets Spreadsheet, Language Capability

PALO ALTO, Calif. — Xerox Corp. has announced additional software for its Ethernet local-area network that is said to include an electronic spreadsheet and the availability of Japanese and Russian

language capability.

Also announced was a 42M-byte disk drive for increased storage on the 8010 microcomputer and a software enhancement for electronic printing, filing and mailing.

The electronic spreadsheet reportedly allows users to handle such spreadsheet operations as forecasts and operating budgets. A large display reportedly allows users to show a full year of data, with 55 rows at

column-width size.

Announced last April and now available, the Japanese and Russian language capability reportedly allows users to mix text in any combination of 10 languages: English, Japanese, German, French, Spanish, Italian, Swedish, Portuguese, Greek and Russian.

Available Nov. 1, the spreadsheet program costs \$300. The Russian software is provided for the 8010 system at no extra cost. The Japanese software costs \$1,200 for typing logic and \$800 for display fonts and Japanese dictionary. The 42M-byte disk drive is priced at \$21,055.

Xerox's Office Systems Division is located at 3333 Coyote Hill Road, Palo Alto, Calif. 94304.

Canon USA Offers FAX-300 Facsimile Series

LAKE SUCCESS, N.Y. — Canon USA recently introduced its FAX-300 series of desktop digital facsimiles.

The Group III transceivers, which the company claims feature the latest in digital facsimile technology, offer transmission capability in the 20-sec range and are compatible with Group II facsimiles, allowing for communications with a broad range of equipment. The Group III transceivers are said to be capable of sending a message across the country in 22 seconds, and they provide that speed at a per-unit cost that is comparable to the cost of slower 40-sec facsimiles, the firm said.

The FAX-330 is equipped with Canon's Automatic Background Control Function and can differentiate between colored background and text or drawings. The system is said

to "white out" automatically background colors for enhanced readability and the clearest possible facsimiles.

The FAX-320E is said to offer everything the FAX-330 offers plus additional features for increased versatility. It offers both enlargement and reduction capabilities and can enlarge as much as 33% with resolution

increased from 200 by 200 line/in. to 272 by 261 line/in. for easier reading.

The retail price of the FAX-330 is \$4,495 and \$5,995 for the FAX-320E. Both units will be available from Canon facsimile dealers in October.

More information is available from The Rowland Co., Inc., 415 Madison Ave., New York, N.Y. 10017.

Electronic Mail Debuts for Users Of DEC PDP-11s

RICHMOND, Va. — Horizon Data Systems has introduced an electronic mail and filing system for Digital Equipment Corp. PDP-11 minicomputers running under the RT-11 and TSX-Plus operating systems.

Quick-Mail can reportedly write, edit, send, read and print messages. The system also reportedly supports "things-to-do" lists as well as personal calendars reminding users of important meetings and other events.

Small files such as utility subroutine source code can reportedly be archived, annotated and extracted when needed. Bulletin boards on the system announce price changes, bug fixes and other items of general interest.

Priced at \$650 for a single CPU, Quick-Mail is available from Horizon Data Systems at 1901 Wildflower Terr., Richmond, Va. 23233.

Feature Converts IBM Typewriter

RYE BROOK, N.Y. — IBM announced that its electronic typewriters, the Model 65 or Model 85 can be used as letter-quality printers for the IBM Personal Computer with an attachment feature from IBM.

Consisting of a circuit board installed in the typewriter and a 6½-ft cable connecting it to the computer, the feature allows either typewriter to operate as a 15.5 char./sec printer.

The IBM 65/85 Personal Computer attachment, including software and field installation of the circuit board and cable, costs \$345.

IBM Information Systems Group is headquartered at 900 King St., Rye Brook, N.Y. 10573.

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Teleconferencing Seminars

Details Released on 1984 'Teleforum' Series

RIDGEFIELD, Conn. — Just as you were growing comfortable with terms such as telecommute, telecopy and teleprocessing, here's a new one to ponder: Teleforum.

At a "national press conference" conducted via teleconference last week, N. Dean Meyer and Associates, Inc. announced its second year of office automation seminars, so conveniently located that attendees need travel no farther than the nearest speaker phone.

The Office Automation Teleforum Series is a series of miniconferences with the audience scattered throughout the U.S. and Canada, all hooked together over telephone lines for

managers to exchange ideas and listen to wisdom from the likes of Wang Laboratories, Inc.'s Fred Wang and Dr. Robert M. Metcalfe, inventor of Xerox Corp.'s Ethernet.

Sponsor Status

To participate in the seminar, users must pay \$1,750, which confers sponsor status upon you and allows any of your company members to attend the program.

The 1984 Teleforum Series is divided into three sections: "The Maturing of Office Automation," "IBM Personal Computer Systems and Applications" and a series for vendors called "Alternative Images of Future

Offices." The sections will be comprised of five two-hour sessions, each with a principal speaker.

Each session has between 130 and 150 "attendees" at 16 separate locations. Of course, allowing everyone to participate actively would create havoc, so each location delegates a group spokesman.

"Not having to travel is one of the most attractive features of the Teleforum Series," commented Thomas Billadeau, president of Office Systems Consulting Group, Inc. in Cambridge, Mass., and co-host of the vendor series.

The first series on office automation will begin in March 1984, along

with the series on IBM Personal Computers. There will be a two-hour session every other month.

More information is available from N. Dean Meyer and Associates, 233 Mountain Road, Ridgefield, Conn. 06877.

Maestro Aids In Producing Host CPU Code, Documentation

(Continued from Page 83)

ware development from system specifications through final release, a vendor spokesman said. It also provides word processing/text processing, electronic mail, automatic calculator, information retrieval and project management.

Syntax menus are available for Cobol, Fortran, PL/I and other languages. Reserved and key words are generated with a single keystroke to reduce compilation errors, a spokesman said.

Supports 24 Workstations

The system can support up to 24 workstations. The workstations can reportedly communicate with each other or with IBM or compatible mainframes. The system also supports both batch and interactive communications with mainframes from Sperry Corp., Honeywell, Inc. and Control Data Corp., a spokesman said.

The cost of a standard configuration consisting of a CPU, 480K bytes of random-access memory, 24 workstations, disk controller, two 67.5M-byte disk drives, 450 line/min printer, two communications controllers and software license is approximately \$197,000.

Monthly maintenance and installation fees are charged separately, the spokesman noted.

More information on the system is available from Four-Phase, 10700 N. De Anza Blvd., Cupertino, Calif. 95014.



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version is \$2,595. Both about a thousand dollars less than the equivalent IBM PC.

For more information, contact Corona Data Systems, 31324 Via Colinas, Westlake Village, CA 91361. (213) 991-1144. Call (800) 621-6746 toll-free.

Or better yet, just grab your hat and head to the nearest Corona PC dealer for a very convincing demonstration.



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Cbema Rejects Government Intervention

By Jake Kirchner
CW Washington Bureau
WASHINGTON, D.C. — The Computer and Business Equipment Manufacturers Association (Cbema) has issued an industrial policy position paper rejecting direct government planning and intervention in the economy.

"Attempts to legislate or massively regulate what should be marketplace decisions can lead to a confused and stagnant economy, periodically and seri-

ously disrupted by changes in political philosophies," according to Cbema.

Cbema spokeswoman Charlotte LeGates said the document will be used to represent the association's views on Capitol Hill and to the public in general. She said Cbema "will be doing a great deal more" work with legislators on this issue.

The position paper was presented Sept. 28 at Cbema's annual fall meeting here. At that time, the association, which

represents 42 firms, including all the major computer hardware manufacturers, also said it has opened its membership to companies dealing in software and telecommunications products.

LeGates said the move will make the association "more representative" of the computer industry as a whole. "A large percentage of our current member companies' revenues are from software," so "it made less and less sense" to exclude soft-

ware firms, she explained.

The Cbema industrial policy statement said the U.S. already has a de facto industrial policy, consisting of "the sum of all laws, regulations and judicial decisions that govern the way we do business, the way the marketplace grows and changes and the way the domestic and international marketplaces interact."

Although it rejected direct government intervention in the name of industrial policy, the document said the association does support "improvements to government policies that create broad incentives for business expansion" through:

- **Tax policy.** Cbema said tax policy should encourage capital formation and growth, extend rapid depreciation benefits to

(Continued on Page 94)

In Wake of Losses

Modcomp Cuts Work Force by 14%

FORT LAUDERDALE, Fla. — After two consecutive quarters of losses in 1983 and an 85% profit decline in the last quarter of 1982, Modular Computer Systems, Inc. (Modcomp) has slashed its work force by 14% or 170 workers.

For the most part, those affected by the reduction in force are white-collar professionals

in every department except sales, the systems maker said. Most discharged workers will receive full salary and benefits for at least two months, although a company spokesman said it is unlikely they will be rehired in the near future.

Commenting on the discharges, Gabriel A. Rosica, president and chief executive offi-

cer, said they were "necessitated by the continued declining level of orders the company has experienced and the fact that the company's overhead structure had been established in anticipation of improved order rates that haven't materialized."

Rosica also said, "These factors have combined to produce operating losses which can't be sustained indefinitely. Therefore, this reduction should help minimize such losses in the near term and put the company back on track for a return to profitability."

Otherwise, Rosica said, the company will initiate cost control measures, including the subleasing of about 168,000 square feet of factory and office space.

Modcomp has also hired a new sales director and consolidated customer service and manufacturing operations in one site. Rosica said the company will announce new products at year's end and will gear up its product advertising campaign in anticipation of the announcements.

Modcomp lost \$550,000 in the second quarter of this year compared with a \$583,000 profit the same period a year earlier.

Shakeout: More Myth Than Reality?

By David C. Dykstra
Special to CW†

The biggest myth concerning the computer industry is that "there will be a major

Analysis

shakeout of computer companies and only a few companies will survive."

Various versions of this quote have been stated by experts and printed in the media for the past 20 years. The number of companies, however, has increased every year. Many computer companies have failed, but every failure has been replaced with two or more new companies.

Many of the experts predicting the shakeout relate the

(Continued on Page 92)



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COMPUTER INDUSTRY

Rumors of Shakeout Seen Greatly Exaggerated

(Continued from Page 91)
computer industry to the automobile industry. The computer industry, however, is more analogous to the entire vehicle industry than the more narrow automobile industry. Even the automobile industry discovered that manufacturer-owned stores could not compete with independent dealers.

There are now over 500 companies making basic computer units. There are over 2,000 companies making computer peripherals and supplies. There are more than 10,000 businesses pro-

viding computer products and services, including software. There are many independent contractors and software developers in the new computer "cottage" industry.

Why are the experts and media predicting a shakeout? Obviously, the larger, established firms would like the public to believe this so that consumers will favor these firms. Many professionals in the computer field cannot, or by choice do not, keep up with the rapid changes in available products. The safe recommendations are for them to favor the products of

the largest companies.

In addition, many of the large professional firms and educational institutions are establishment-oriented. They do not believe that the freewheeling, entrepreneurial, seat-of-the-pants planning style of many new companies can develop and support technologically advanced quality products.

Many of the best small business computer products come from newer companies, not from IBM and the other large companies. Nearly every purchaser of computer products compares the product he purchases against the large companies' products.

Formidable Marketing

The newer small companies are also up against the large companies' formidable selling techniques and pressures. The small companies, therefore, could not exist if they did not have better products.

The U.S. computer industry volume is currently \$125 billion per year. This is comprised of \$90 billion in product and service sales and \$35 billion relating to in-house programming by larger organizations. In 1982 the industry increased 25% over 1981 while the country was in a recession. More of this growth came from the newer and smaller companies than from the larger, long-established companies.

Although IBM's percentage growth over the past decade has not matched the industry (reflecting a decrease in market share), each year its dollar increase in annual sales has been greater than the total sales of the second largest firm in the industry. The majority of IBM's sales are from the very large, multimillion dollar computers.

Obviously, large percentages of growth become more difficult as size increases.

Qantel Files For Reversal

BOSTON — Qantel Corp. has filed an appeal in the U.S. Circuit Court of Appeals seeking to overturn a lower court judgment ordering the company to pay a systems distributor \$4.9 million in damages and fees.

The appeal will likely postpone a resolution of the case until some time next year. The lower court found Qantel had acted improperly in executing a distribution contract with Computer Systems Engineering, Inc. of Burlington, Mass.

The same court last month denied Qantel a retrial, issuing a strongly worded statement condemning Qantel for its conduct in the matter.

Also, the larger companies have the majority of their business in the more mature industries or industry segments that do not grow as fast as many of the newer industries or segments.

The current fast-growing segments of the computer industry are small computers, software and services. Small computers are receiving a lot of attention, but they currently represent less than 10% of the industry's product sales.

The larger companies, therefore, must continue to emphasize the larger com-

puters. Product development and sales of smaller computers have received their impetus from the newer, smaller companies.

As the cost of computers continues to decline while performance increases, the variety of applications will increase. The niches in the computer manufacturing area will be comprised of many special-purpose computers.

Dykstra is an independent DP and office automation consultant and president of Easy Data Corp. of Newport Beach, Calif.

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AM International Files Plan

CHICAGO — Business graphics equipment maker AM International, Inc. here late last month filed its proposed plan of reorganization with the U.S. Bankruptcy Court, although the principal aspects of the plan have not yet met with its creditors' approval.

The plan, subject to creditor, shareholder and court approval, provides

for a combination cash and common stock settlement of debts.

The cash portion would come from funds already accumulated by the company, the pending termination of its comprehensive retirement plan, about \$50 million from secured borrowings and the sale of common stock for \$5 million to the employee stock ownership plan.

Further, according to the plan, allowed administrative and priority claims, allowed unsecured claims of less than \$750 and secured prepetition claims would be satisfied in their full amounts.

AM International employs more than 10,000 workers.

The company posted sales of \$558 million in fiscal 1983.

Cbema Paper Rejects Direct Intervention

(Continued from Page 91)
high-technology industries and promote investment in research and development.

Also, the association said, tax policy should not subject overseas earnings of U.S. firms to double taxation.

It should, however, help expand international markets by creating a Domestic International Sales Corp. al-

ternative that is legal under the General Agreement on Tariffs and Trade, according to the association.

• **Research and development.** The paper said R&D policy should encourage and not inhibit joint R&D ventures in the private sector.

It should support advanced research projects "where there is a defined national need and where technology requirements and costs are beyond the practical commercial horizon," the paper stated.

• **Trade policy.** Trade policy, Cbema said, should promote mutually open markets by avoiding protectionist legislation, oppose "unfair" foreign government actions to protect domestic producers from competition and discourage trading partners from creating barriers to high-technology trade to foster domestic industries.

Trade policy should also "achieve a balance between export controls and export enhancement programs" and include specific export incentives.

Protecting investments in software development should be accomplished by government support of a new international treaty if software is judged inadequately protected under current agreements.

• **Technology policy.** The government should "help ease the transition to new work technologies and emphasize training workers for emerging jobs," according to Cbema, which called training a "joint responsibility of government and industry."

The association also said "technology policy should emphasize improvements in scientific and technical education."

It should, in addition, "provide information and scientific fact about work place technologies while avoiding unnecessary interference in employer/employee relations," Cbema said.

• **Telecommunications policy.** The government should "endorse competition and avoid imposing regulation on currently unregulated areas," the paper said. Also, the association maintained, telecommunications policy should support universal service while supporting cost-based pricing for telecommunications services, "encourage industry to offer the widest possible variety of enhanced services" and "promote international policies that foster growth and provide maximum flexibility in offerings."



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House, Senate Extend Export Act

WASHINGTON, D.C. — The Export Administration Act received a 14-day reprieve just before it was to expire Sept. 30.

Both the House and Senate passed a 14-day extension of the act that places restrictions on high-technology exports to Eastern bloc countries.

Wayne Abernathy, a staff member with the Senate

Banking Committee, said early last week that prospects for passage of the bill were "fair." However, with the Senate scheduled at press time to recess on Oct. 7 for 10 days, it seemed quite likely that a further extension would be required to maintain the provisions of the law.

Substantial differences between House and Senate ver-

sions of the bill to renew the act must still be reconciled after initial passage and subsequently must be submitted to both chambers for approval of any compromise that is reached.

Several industry groups have lobbied for months seeking an easing of export restrictions that are said to hinder the international competitiveness of American business.

Exec Demand Still Rising, Report Finds

PALO ALTO, Calif. — The demand for high-technology executives continued to boom in the third quarter this year, growing 47% compared with the same period last year, according to Korn/Ferry International, a management search firm.

Demand for executive talent is particularly strong in the semiconductor area, which this year awoke from the recessionary doldrums of 1982, according to Korn/Ferry's 47th Quarterly National Index of Executive Vacancies.

The index is based on a survey of 750 of Korn/Ferry's clients and examines positions paying in excess of \$75,000 per year.

On the other hand, the home and personal computer markets are the sole soft spot in terms of executive demand, as consumers appear to be waiting for an industry shakeout and lower prices, the index showed.

Executives in greatest demand were those in general management, marketing and sales and finance. "The move to add marketing and sales managers is consistent with a recovery in which companies are beginning to launch new product lines and planning for expansion," the survey noted.

"The increase in demand for human resources officers points to intensification of company efforts to better manage and use personnel."

The East Coast continued to post the dominant share of executive hiring with 36% of the total, up from 33% the same period last year, the index showed. The West Coast followed closely with 35%, down from 38%, and the Southeast registered a sharp increase in demand to 10% from 7%, led by recruiting in financial services.

More information on the survey is available from Korn/Ferry, which is located at 277 Park Ave., New York, N.Y. 10172.

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National Semiconductor Posts Sales, Profit Gains

SANTA CLARA, Calif. — National Semiconductor Corp. continued to show the renewed strength of the chip industry through the summer as it reported gains in both sales and profit for the first quarter ended Sept. 18.

The firm posted sales of \$432 million, compared with \$350 million a year ago, and profit of nearly \$11 million or 41 cents per share, compared with \$60,000 during the same period a year earlier. Com-

pany officials said both the components and digital systems segments of the business achieved significant operating improvements in the quarter.

Charles Sporck, president and chief executive officer, said, "The company attained the strongest order rates at any point in its history. Increased orders within the semiconductor division have resulted in longer lead times and stronger prices for some products."

Honeywell to Form Trading Firm For Companies Selling Abroad

MINNEAPOLIS — Honeywell, Inc. announced it will establish a trading company to offer marketing and distribution services to companies that wish to sell high-technology products abroad.

Honeywell High-Tech Trading, Inc. will sell through the parent's current distributors and sales agents in Europe, Latin America, the Middle East, Africa and Asia and will also use Honeywell offices in 29 countries to expedite distribution.

The new venture will be headed by Biorn Biornstad, formerly Honeywell Europe's vice-president, who will serve in his new capacity as president and general manager. Biornstad said the company will serve small to medium-size firms looking to export high-technology products and services, as well as the worldwide customers for those products. The company's strategy is to facilitate the exporting and importing of client products worldwide and, at the same time, to expand the market for all Honeywell products

in those countries where Honeywell does not have affiliated companies, Biornstad added.

Honeywell High-Tech will be organized as a separate corporation, wholly owned by Honeywell and governed by a nine-member board of Honeywell executives. It will initially employ

about 120 people, mostly drawn from other Honeywell operations, to handle finance, administration, marketing, purchasing and transportation support functions.

Companies interested in the service can obtain information from Honeywell at its main offices here.

Study: Most CRTs Sold Directly to End User

WELLESLEY, Mass. — The majority of CRT terminal shipments are being sold directly to the end user, according to a recent study by Venture Development Corp (VDC).

The study, titled "The Alphanumeric CRT Terminal Industry III: A Strategic Analysis," found that over 50% of dumb and smart terminals are being shipped directly to the end user.

The management consultant firm also found that the majority of these terminals

were being shipped by systems manufacturers such as IBM, Digital Equipment Corp. and Hewlett-Packard Co.

The majority of terminals being sold to the noncaptive market segment are sold through dealer/distributors. These vendors distribute their terminals through various dealers and distributors, according to the study.

The study is available for \$2,790, a VDC spokesman said from One Washington St., Wellesley, Mass. 02181.

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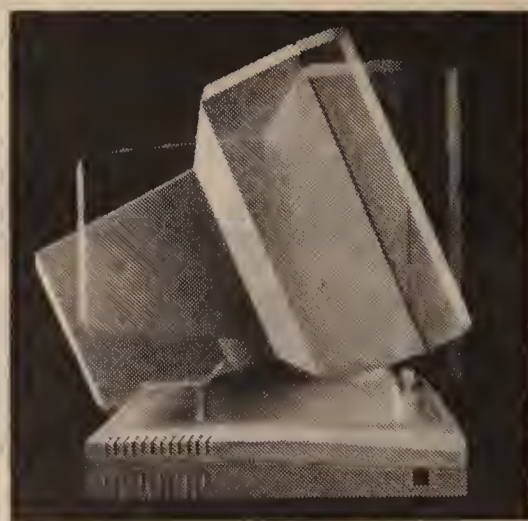
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Non-Telecommunications Components

Fiber Optics Mart Seen Breaking New Ground

NEW YORK — Fiber optics technology has proven itself in commercial communications such as telephone trunk connections, but another set of applications is about to become viable, according to a recent market study by Frost and Sullivan, Inc. based here.

Short-haul applications of fiber

optics in computer systems, instrumentation, process control, medicine, local-area networks and the military will generate \$475 million in annual component sales by 1990, up from only \$47 million last year, according to the 255-page report, "The Non-Telecommunications Fiber Optics Component Market."

Components required for these users are not the same as those needed for telecommunications. While laser diodes are preferred for long-distance applications, light-emitting diodes are sufficient for lower data transmission rates in most short-haul uses, the study reported.

The military/aerospace segment of this market will be the largest, worth \$200 million in 1990, up from \$30 million in 1982. The process and machine control market is second with \$80 million in sales expected in 1990, up from \$6 million last year.

The computer segment, comprising computer-to-computer, computer-to-terminal and intracomputer

uses, will grow from \$5 million to \$70 million and biomedical applications from \$3 million to \$50 million during the same period. The commercial/business segment, including both networks and intramachine use, will increase to \$45 million from \$2 million, according to the study.

The consumer market, which includes automotive applications, was valued at only \$1 million in 1982 but will skyrocket to \$30 million in 1990.

The leaders in this market are considered to be Honeywell, Inc., Hewlett-Packard Co. and Motorola, Inc.

The study is available for \$1,250 from Frost & Sullivan, 106 Fullerton St., New York, N.Y. 10038.

Masscomp's 32-Bit Mini Captures Industrial Award

CHICAGO — *Industrial Research and Development*, an international journal of research, development and quality assurance, has granted its Industrial Research 100 Award to Masscomp, based in Littleton, Mass., for the company's MC-500 32-bit multi-processor-based computer system.

The award, created to honor the 100 most significant technological advances of the year, was presented at the International Research 100 Awards banquet held here at the Museum of Science and Industry. The Masscomp system was chosen along with products from companies such as Eastman Kodak Co., Exxon Corp., Ford Motor Co. and General Electric Co.

According to Masscomp, the MC-500 minicomputer was designed to help scientists, engineers and other users acquire, analyze and display graphs and images of data in order to monitor experiments and other real-time processes. Among the applications running on the MC-500 system are medical imaging, clinical and engineering laboratory research, computer-aided design and engineering, industrial and experimental process control, seismic research in energy

exploration and stress and vibration testing.

Micro Add-Ons Focus of Report

NEW YORK — Personal computer users spend an average of \$1,027 on peripheral equipment and other add-on hardware the first year after purchasing their systems, according to a report from Frost & Sullivan, Inc.

The report, "The Personal Computer Hardware Add-On Device Market," said this adds up to a \$900 million market for manufacturers of add-on microcomputer hardware, with the 1986 market likely to be in excess of \$4 billion.

A printer is by far the most popular add-on item, with 15% of personal computer users having already bought one and another 11% anticipating such a purchase. The next most popular after-market item is the standard 5¼-in. floppy disk drive, with 11% of computer users buying one in the first year and another 8% anticipating future purchases.

Additional memory, most often 32K bytes, was acquired by 9% of buyers after the initial micro purchase, the report noted.

The 228-page report is priced at \$1,275 from Frost & Sullivan, 106 Fulton St., New York, N.Y. 10038.

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4) Offer valid in U.S. only.
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ICCS Opens Institute to Fill DP Education Gap

NEW YORK — In an effort to fill what the company describes as the "gap that currently exists in computer education," International Computers and Communication Systems, Inc. (ICCS) has opened the Sequoia Comput-

Mobile Phone May Prove Windfall

NORWALK, Conn. — Federal Communications Commission (FCC) regulatory decisions may give the nation's telephone companies a \$5 billion windfall in the implementation of cellular radio-telephone, according to a recent report from International Resource Development, Inc. (IRD).

IRD claimed current FCC rulings will give the Bell operating companies a one- to two-year lead time in implementing service in most major cities. Cellular radio-telephone is a new technology that will allow users to communicate with one another using mobile and portable phones.

The FCC has authorized two cellular systems per city, one of which has been allocated to the regular "wireline" telephone company, while the second is open to any qualified "nonwireline" bidder, principally the Radio Common Carriers, who currently supply mobile radio services.

So Few Applicants

The wireline carriers, the report said, have cut deals to divide the licenses in each city because there are so few wireline applicants (less than two per city) and are ready to implement the service now.

The nonwireline carriers, however, it added, are likely to undergo lengthy comparative hearings in most cities because there are five to 10 applicants per city. This could result in a lead of 700,000 users, worth \$5-billion in revenues to the telephone companies during the next decade, IRD reported.

The report is priced at \$1,850 and is available from IRD at 30 High St., Norwalk, Conn. 06851.

er Institute.

The Sequoia Institute, the first of what ICCS expects will be a nationwide network of computer education institutes for training computer professionals, will offer six-month full-time and one-year part-time certificate degree programs in entry-level programming, scientific programming, telecommunications programming, data base systems program-

ming and systems analysis and advanced programming techniques.

Dr. Dina Bedi, president and founder of the institute, said Sequoia's philosophy will be to provide students with direct access to the most extensive and technologically advanced computer hardware systems available and to maintain a teaching staff of professionals employed in the computer field.

Bedi said the institute will be equipped with an in-house IBM 4341 with telecommunication facilities to permit lab work from off-site terminals and IBM 3278 terminals for lab sessions, assigned projects and student practice. The school will have access to a Prime Computer, Inc. 550 supermini and is expecting delivery of a Digital Equipment Corp. VAX-11/750 system.

Sequoia's faculty will include industry professionals from institutions such as Brookhaven Laboratories, Bell Laboratories and Manufacturers Hanover Trust Co.

Classes at Sequoia, which is licensed by the New York State Department of Education, will begin on a monthly basis, with tuition set at \$3,400. The institute is located at 10 E. 21st St., New York, N.Y. 10010.

NEW MATRIX PRINTER OUT PERFORMS ITSELF 3 TO 1.



H I G H P E R F O R M A N C E

Correction

NCR Corp. is actively marketing both its V-8500 and V-8600 series systems. It was incorrectly reported in the Sept. 26 issue of *Computerworld* that the company was replacing the V-8500 with the V-8600.

IBM Predicted to Grow Fourfold in 10 Years

By Robert Batt

CW West Coast Bureau

SAN FRANCISCO — IBM will grow more than fourfold over the next 10 years, reaching revenues of \$176 billion by 1993, according to The Gartner Group, Inc., a data processing market research firm.

Speaking here at the opening session of the IBM Futures Conference, Mark Ludwig, vice-president at

'There is a war going on in the marketplace, and it is predictable that IBM is going to win a lot of the battles. In fact . . . IBM could afford to take a dive in one area of the market and still survive handily in terms of its bottom-line profit.' Mark Ludwig, vice-president of the Gartner Group, Inc.

Gartner, said that by the early 1990s, IBM will account for 2% of the U.S. gross na-

tional product.

With an estimated annual average growth rate of 16%,

Big Blue, he said, can expect to reap pretax profits of \$14 billion in 1986, rising to \$25 billion in 1991.

Traditional IBM business sectors, such as mainframes, are expected to grow 12% a year, rising from \$27 billion this year to more than \$84 billion in 1993, he added.

Ludwig told his audience of users and vendors: "To grow at such a rate IBM must become a new company in

some ways. One mechanism for accomplishing this growth is diversification into product areas such as personal computers and telecommunications carriers."

The latter, he noted, was already a \$200 million business, employing just 500 people, a ratio of \$400,000 for every employee, and with an expected growth rate of 40% a year over the next few years.

Total revenues of IBM's independent business units, Ludwig added, are expected to rise from the current \$3 billion to \$20 billion over the next decade.

Implications of Growth

The implication of this growth pattern, he asserted, is that IBM is going to absorb some of the revenues of current competitors such as Digital Equipment Corp., Wang Laboratories, Inc., Hewlett-Packard Co., Data General Corp., Prime Computer, Inc. and some of the major Japanese manufacturers.

"There is a war going on in the marketplace, and it is predictable that IBM is going to win a lot of the battles. In fact, by growing at the rates predicted, IBM could afford to take a dive in one area of the market and still survive handily in terms of its bottom-line profit," Ludwig contended.

In contrast to some other pundits who credit IBM's success to its marketing prowess, Ludwig asserted that manufacturing, not marketing, will be the most important key to IBM's future growth.

"IBM is basically a manufacturing-driven company. It is almost unbeatable because it is essentially a low-cost producer that uses every channel of distribution it can get its hands on. To simply say that IBM is a marketing-oriented company doesn't tell the whole story," he asserted.

As a case in point, he maintained, IBM's product cycles have dropped to an average of three years, after being seven years a short while ago. "This trend is very important as the cost of capital increases. IBM is able to double the number of its shipments and improve capacity by shortening product life cycle. It can therefore respond to competitors such as DEC far more quickly."

Ludwig cited as an example of this trend the IBM Personal Computer, which took only 18 months from its conception to its first deliveries.

Nevertheless, he conceded, to grow at the pace predicted, IBM has been forced to adopt practices that hitherto were shunned.

INTRODUCING THE NEW DS220 MULTI-MODE MATRIX PRINTER

In the beginning was the Datasouth DS180. A printer that defined high performance printing, with a balance of high technology design and mechanical simplicity. A high throughput printer that produced clean hardcopy under the most severe conditions.

Now there's the Datasouth DS220. A printer that raises those high performance standards and applies Datasouth technology to multiple printing tasks—all at one time.

The Datasouth DS220 redefines high performance for multimode printing the way the DS180 did for data quality printing.

For speed, the DS220 combines a 220 CPS print speed with servo-controlled logic seeking and high-speed tabbing over blank spaces. This allows the DS220 to zip instantly from one printable character to the next. In side-by-side tests of real-task performance—not just spec-sheet comparisons—the DS220 outperforms its rivals time after time.

For correspondence, the DS220 uses its 40 CPS bi-directional NLQ mode to form characters with the precision and clarity you would expect from a word processing printer.

And for graphics, the DS220 adds high performance artistry to popular microcomputer applications programs through high-resolution, dot-addressable output. Sharp new details emerge from business charts and graphs, and from engineering drawings.

The sum is even more than three printers in one. The DS220 offers a total of eleven different pitches and fonts along with seven international character sets. Plus non-volatile space for up to 64 do-it-yourself characters for downloading from the host computer.

And those are just the printing capabilities. In other respects, the DS220 outperforms not just itself but virtually every other printer on the market. Its front panel programming sets new standards in user friendly printer ergonomics. Its four digit LED display and push button panel allow programming of over fifty features, with a minimum of fuss and confusion. Those features include a variety of interface and communications selections that allow compatibility with a wide range of mini and microcomputers. And the DS220 handles six part forms with its adjustable tractor feed, as well as cut sheets and letterhead with its friction feed.

Best of all, the DS220 advances all the engineering, design and mechanical virtues established by its forerunner, the DS180. In the Datasouth tradition, the DS220 is made to run virtually nonstop in a wide variety of applications.

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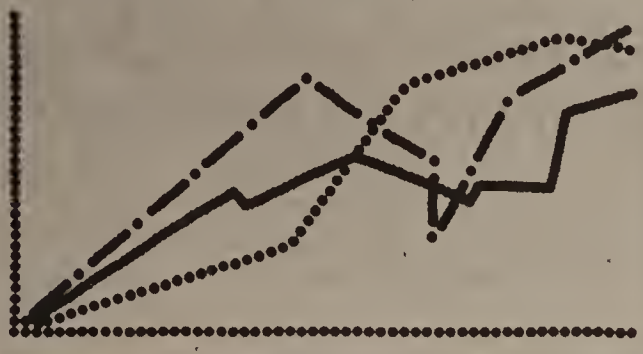
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Prime, Convergent To Boost Ties

NATICK, Mass. — Prime Computer, Inc. announced it will strengthen its ties with Convergent Technologies, Inc. with the purchase of as much as \$150 million worth of Convergent's products for Prime's professional workstation.

The products, details of which were not disclosed,

will become an integral part of Prime's distributed systems strategy, Prime said.

Convergent Technologies sells its 16- and 32-bit microprocessor-based systems to the mainframe vendor market.

Included in the agreement are stock purchase warrants.

Privately Owned Federal Shop

GSA Cuts Ribbon on Micro Store

WASHINGTON, D.C. — With the aid of a robot named "Plus," Gerald P. Carmen, administrator of the General Services Administration (GSA), recently cut the ribbon to celebrate the opening of the first privately owned microcomputer and software retail store for the federal government.

Office Technology Plus, which is located at GSA

headquarters here, is owned and operated by a consortium of high-technology firms headed by The Math Box, Inc., which operates a chain of retail computer stores in the Washington/Baltimore area. Other companies represented in the consortium are M/A-Com Sigma Data, MAI/Sorbus Service, Software Centres International, Moore Business Cen-

ter and PC Telemart.

Carmen conceived the store as a way for the federal government to benefit from productivity increases reflected in the private sector by the development of microcomputer technology and software publishing. Opened on a pilot basis in August, Carmen said the store had received orders in excess of \$782,000 by mid-September from government agencies such as the Departments of Interior, Treasury and Transportation, in addition to the Navy, the White House, the Executive Office of the President, the Senate and the Federal Bureau of Investigation.

According to Avner Parnes, president of The Math Box, the retail outlet is "the solution to the confusion in buying and using microcomputers both in the U.S. government and the private sector." Parnes said that each company involved in the venture is an expert in its particular field: hardware, software, service, training and supplies.

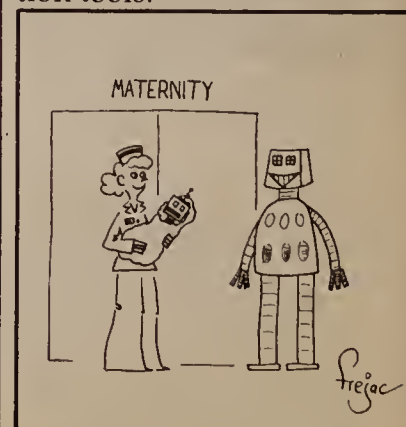
The GSA estimates there will be one million microcomputer users in the federal government within the next six years. The GSA plans to open 12 additional stores to accommodate federal offices throughout the country.

Horizon, DEC Reach Software Pact

SAN FRANCISCO — Horizon Software Systems, Inc. and Digital Equipment Corp. have reached an agreement whereby Horizon has become the exclusive supplier of DEC-certified office automation software for DEC computers using the Unix operating system, Horizon said.

Machines included in the agreement are the PDP-11, VAX superminicomputer series and Professional personal computer line.

Terms of the agreement dictate that DEC will manufacture and distribute Horizon's integrated series of Unix-based office automation tools.



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Lee Data's universal terminal system design provides access to both 3270 and VT100 applications.

Now with Lee Data's new 3270/Async Communication System (Series 400) you can eliminate the cost and inconvenience of needing separate displays for access to 3270 and VT100 applications.

The Lee Data universal terminal system approach is another innovative Lee Data design that allows a single Lee Data display to access applications and data from an IBM CPU, a non-IBM system such as DEC, H-P or Prime, and timesharing services. And a simple command entered from the display keyboard is all that is required to switch from 3270 to VT100 operating mode and back again. What could be easier?

The Series 400 System incorporates a new hybrid approach to system operation that is simpler and more efficient than

protocol conversion. This approach allows a Lee Data controller to provide dedicated 3270 and VT100 processors for concurrent, but independent application access.

In addition, a single Lee Data controller provides you 3270 compatibility via either a remote BSC or SNA/SDLC or a local SNA or non-SNA interface, as well as 1 to 16 RS232C ports for your asynchronous application needs. Line speeds available are from 300 to 19,200 BPS.

The Series 400 System also provides you support for up to 32 devices, including Lee Data's unique All-In-One display that offers dynamic selection of 4 screen sizes—three 80-column and one 132-column. Lee Data's 3279-compatible color displays and a full line of printers are

also available as part of the 32-device complement.

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Supershots

The investment banking firm of Donaldson, Lufkin and Jenrette has been engaged by **Computer Devices, Inc.** to seek an equity investor or purchaser for the company. Preliminary conversations with several firms are already in progress, according to a company spokesman.

Graphic Software Systems, Inc. has announced a program to distribute software device drivers to graphics peripheral equipment manufacturers. Drivers for the Microsoft, Inc. MS-DOS and the Visicorp Visi are available, and drivers for Unix should be available soon.

IBM will market the IBM Personal Computer Instructional System (PCIS) developed by **Computer Systems Research, Inc.** PCIS allows users with no programming experience to create, present and administer computer-aided instruction courses on the IBM Personal Computer.

The Marketing and Statistics program of the **Computer and Business Equipment Manufacturers Association (Cbema)** has compiled the *Computer and Business Industry Market Data Book*. The book contains an analysis of industry facts and figures covering the last 22 years, collected from surveys and from industry and government sources. The *Industry Market Data Book* costs \$350 per copy prepaid or \$300 each for two or more copies. It is available for \$300, or \$250 each for two or more copies if ordered before Oct. 31. It can be ordered from Cbema at Suite 500, 311 First St. N.W., Washington, D.C. 20001.

Apple Computer, Inc. and nine software companies have begun a joint marketing program designed to increase the ability of retail computer dealers to meet the needs of small-business customers. More than 15 products are included in the pilot program, launched in conjunction with Apple's current small-business promotion, which includes the Apple IIe and Apple III computer packages and new software for small businesses and professionals.

Digital Equipment Corp. and **Horizon Software Systems, Inc.** have announced an agreement under which Horizon will be the exclusive supplier of DEC-certified office automation software for DEC machines using the Unix operating system. DEC will manufacture and distribute the Horizon Software System, an integrated series of Unix-based office automation tools designed for both experienced and inexperienced users.

Bell & Howell Service Co. has been named exclusive authorized third-party maintenance supplier for **Printek, Inc.**

National Semiconductor Corp. has announced plans to build a

125,000 sq ft research and development facility adjacent to its corporate headquarters in Santa Clara, Calif. The project is expected to cost \$75 million.

Advanced Systems, Inc. will market video courses for IBM software developed by **Amdahl Corp.** and a series of courses from **Digital Equipment Corp.** covering computers in business.

Quasar Systems Ltd. of Canada will convert its Powerhouse line of fourth-generation application development software for use on **Data General Corp.'s** 32-bit Eclipse MV/

Family Systems. The Powerhouse products will be marketed by Quasar Systems under the Data General Independent Software Vendor program.

System Industries, Inc. plans to establish a \$4 million facility in Dublin. The operation, System Industries Network Storage, will be located at Ireland's Industrial Development Authority advance factory and will produce memory storage products.

Delta Data Systems Corp. has formed a sales and marketing unit, Terminal Product Sales, to concentrate on computer terminal sales and

development. Vice-President Philip H. Gallo will head up the unit.

Masscomp has signed a joint venture agreement with **Lanpar Technologies, Inc.** establishing **Masscomp Canada, Inc.** The new company has exclusive manufacturing and distribution rights in Canada for all present and future Masscomp products.

Software Design Associates, Inc. has established a new division, **SDA-Micro/Support, Inc.**, to provide training and support to corporate users of the IBM Personal Computer and Personal Computer XT.

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Forecasts & Findings

PBX Market Saturated

The private branch exchange (PBX) market is mature and, in terms of market penetration, relatively saturated. However, sales of PBX equipment will continue to dwarf all other competing communication signal-routing methods for the foreseeable future, according to a recent report on the industry's future over the next five years.

The growth in installed bases of PBX is not likely to exceed a 4% annual rate over the next five years, and replacements will account for the bulk of PBX shipments, but total annual value of shipments will grow by more than \$2 billion over the next three years at an annual rate of

12.8%, according to "The PBX Industry: A Strategic Analysis." Local-area net equipment shipments will grow at an annual rate of 66% through 1985, but will only increase market share from the current 2% to 9%.

The 115-page report is available for \$2,790 from Venture Development Corp., 1 Washington St., Wellesley, Mass. 02181.

IBM: Toward Integration

Over the next three to five years, IBM will consolidate its equipment into a more truly integrated family of products, limiting the money-making opportunities that have enabled hundreds of companies to profit by taking advantage of the incompatibility among IBM products, accord-

ing to a report released recently by The Yankee Group.

"Impact: IBM" predicts IBM over the next six to 18 months will enhance its Personal Computer family's capabilities as multifunctional communicating workstations, expand and improve IBM data terminal emulation and introduce a board that will allow the Personal Computer to run a 370 instruction set and operate as a VM workstation. Over the next one to two years, the report said, IBM will ease Personal Computers and other intelligent terminals into high-end applications and reduce prices for the 3278. In two to three years, IBM will introduce "personal" terminals with artificial intelligence and a higher priced scientific model of the

370-based instruction set terminal, according to the study.

The report, to be presented in three volumes, is available for \$1,250 from The Yankee Group, 89 Broad St., Boston, Mass. 02110.

Turnkey Sales Booming

Sales of mini and microcomputer turnkey systems amounted to \$7 billion last year and will rise to \$26 billion in 1987, according to a report by Frost & Sullivan, Inc. analyzing six representative applications markets.

"The Mini-Microcomputer Turnkey Engineering Systems Market" analyzes the seismic exploration, laboratory analysis, energy management, image processing, typesetting and agriculture markets, which it said were cumulatively worth about \$900 million last year and will total \$2.9 billion in 1987. The agriculture market will experience the fastest growth, jumping from about \$7.5 million last year to \$140 million in 1987, the report predicted.

The 228-page report, No. 1208, is available for \$1,275 from Frost & Sullivan, 106 Fulton St., New York, N.Y. 10038.

Graphics Spurring Growth

The availability of bit-mapped graphics displays at reasonable costs will spur a fivefold increase in the business graphics market by 1987, with improved display technology and advances in software and output shifting business graphics from an optional extra to an essential feature on multifunctional business computers, according to a recently released market report.

The report, "Management Workstation Graphics," said that lower marginal costs of providing graphics support on multifunctional systems has stimulated demand in that segment at the expense of dedicated graphics systems. Graphics displays will lead the total business graphics market with shipments climbing from \$1.3 billion in 1982 to more than \$10 billion in 1987, according to the study. Business graphics software alone is predicted to be a \$1.8 billion market by 1987.

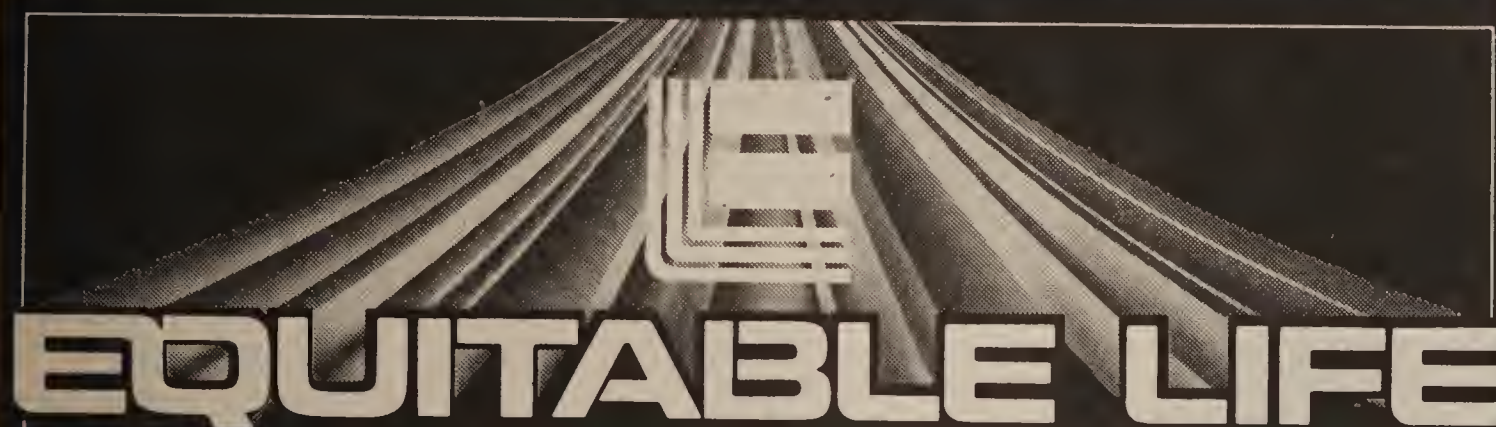
The report is priced at \$1,695 and is available from Advanced Resources Development, 28A Park St. Station, Medfield, Mass. 02052.

Nonimpact Printers Down

A market study predicts more disappointments than market successes in the nonimpact printer field over the next 10 years, as low-cost daisy-wheel and matrix-impact printers capture the interest of office automation networks. However, ultrafast IBM 3800 and Xerox Corp. 9700 electrophotographic printers have reportedly established solid positions at the top end of the market.

Initial high prices of nonimpact printers combined with plummeting costs of daisywheel printers led to "embarrassing failures" in the industry, according to "Nonimpact Printers in the U.S.," although the report expects growth from \$900 million in 1983 to \$1.7 billion by 1993.

Priced at \$985, the report is available from International Resource Development, Inc., 30 High St., Norwalk, Conn. 06851.



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Executive Corner

• **Ben P. Ragusa** has been promoted to corporate executive vice-president at Lanier Business Products, Inc.

• **Ernest A. Carlson** has been named vice-president of sales at Pixel Computers, Inc.

• **Daryl A. Ferguson** has been promoted to vice-chairman of Technicom International, Inc.

• **Richard J. Tata** has been appointed vice-presi-

dent of manufacturing at Advanced Matrix Technology, Inc.

• **Charles R. Jones** has been appointed vice-president, external affairs, for AT&T Communications, the AT&T organization that will provide long-distance and international services after the Bell System divestiture on Jan. 1.

• **Maurice G.T. Bailey** has been named vice-president

of sales and marketing, and **Robert B. Bellman** has been named director of software at Scott Systems, Inc.

• **Thomas B. Towers**, former vice-president of marketing at Visicorp, has been named president and chief executive officer of Knoware, Inc.

• **Dr. Ray S. Moore** has been appointed vice-president of engineering for Interlan, Inc.

• **Donald J. Webster** has been elected senior vice-president of technology for Communications International, Inc.

• **David T. Bailey** and **James H. Kilpatrick** have been appointed to senior vice-presidents, and **Ronald L. Aldrich** has been promoted to vice-president at Policy Management Systems Corp.

• **Philip Schneider**, a former Western Union, Inc.

vice-president, has been named a senior vice-president at Fairchild Industries, Inc.

• **Jan F. Ahart** has been elected vice-president and treasurer at Datapoint Corp.

• **Jerry W. Gaskin** has been elected vice-president and controller of Gould, Inc.

• **Mark E. Goldman** has been appointed vice-president, marketing and sales, for Florida Data Corp.

• **C. William Ferguson** has joined Sorcim Corp. as vice-president, sales.

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Mergers & Acquisitions

Computer Products, Inc., Fort Lauderdale, Fla., has acquired Quantum Systems, Inc. of New Orleans for an undisclosed number of Computer Products common shares. Quantum will operate as a unit of Computer Products' Measurement and Control Systems Division.

Sterling Software, Inc., Dallas, has acquired Pacesetter Systems, Inc., also of Dallas, in exchange for 250,000 shares of Sterling Software common stock valued at \$4.7 million.

Endata, Inc., Nashville, Tenn., has acquired the Micrographics Division of Computeristics, Inc. for approximately \$1 million in cash.

Peat, Marwick, Mitchell & Co. has acquired the assets of The Catalyst Corp., a software developer. Terms of the acquisition were not disclosed.

Science Management Corp. has announced an agreement in principle to acquire Intech Systems Corp. of Dallas.

Computone Systems, Inc., Atlanta, has signed a letter of intent to merge under a pooling of interest basis with MCT Information Systems and The Computer Room, both of Albany, N.Y., in exchange for Computone Stock valued at \$4 million. MCT and The Computer Room will operate as a joint company under the same management.

Wyly Corp., Dallas, has completed acquisition of Open Systems, Inc. of Minneapolis for \$15 million in cash. Open Systems will operate as a Wyly subsidiary. Wyly has also signed a letter of intent to acquire Financial Software of America, Inc. of Winter Park, Fla.



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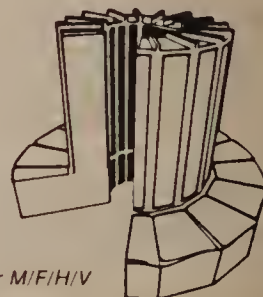
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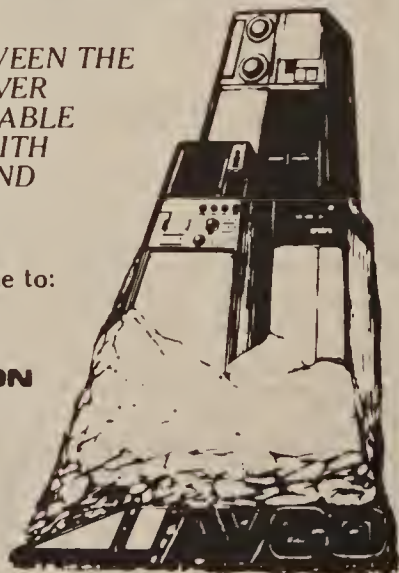
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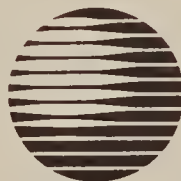
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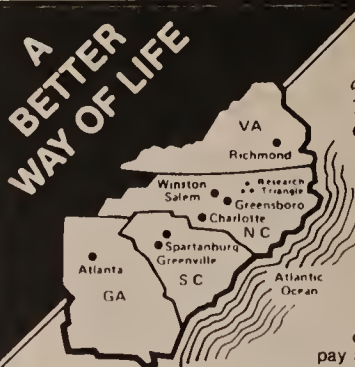


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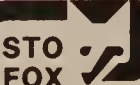
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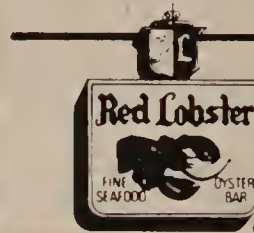
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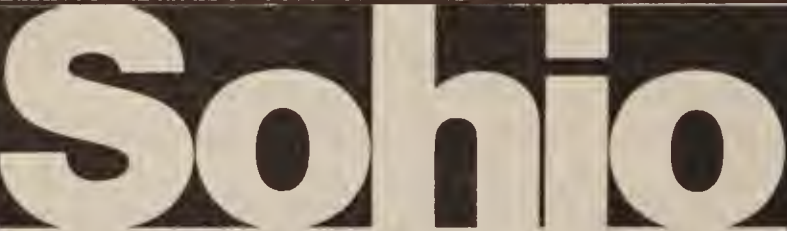
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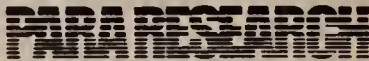
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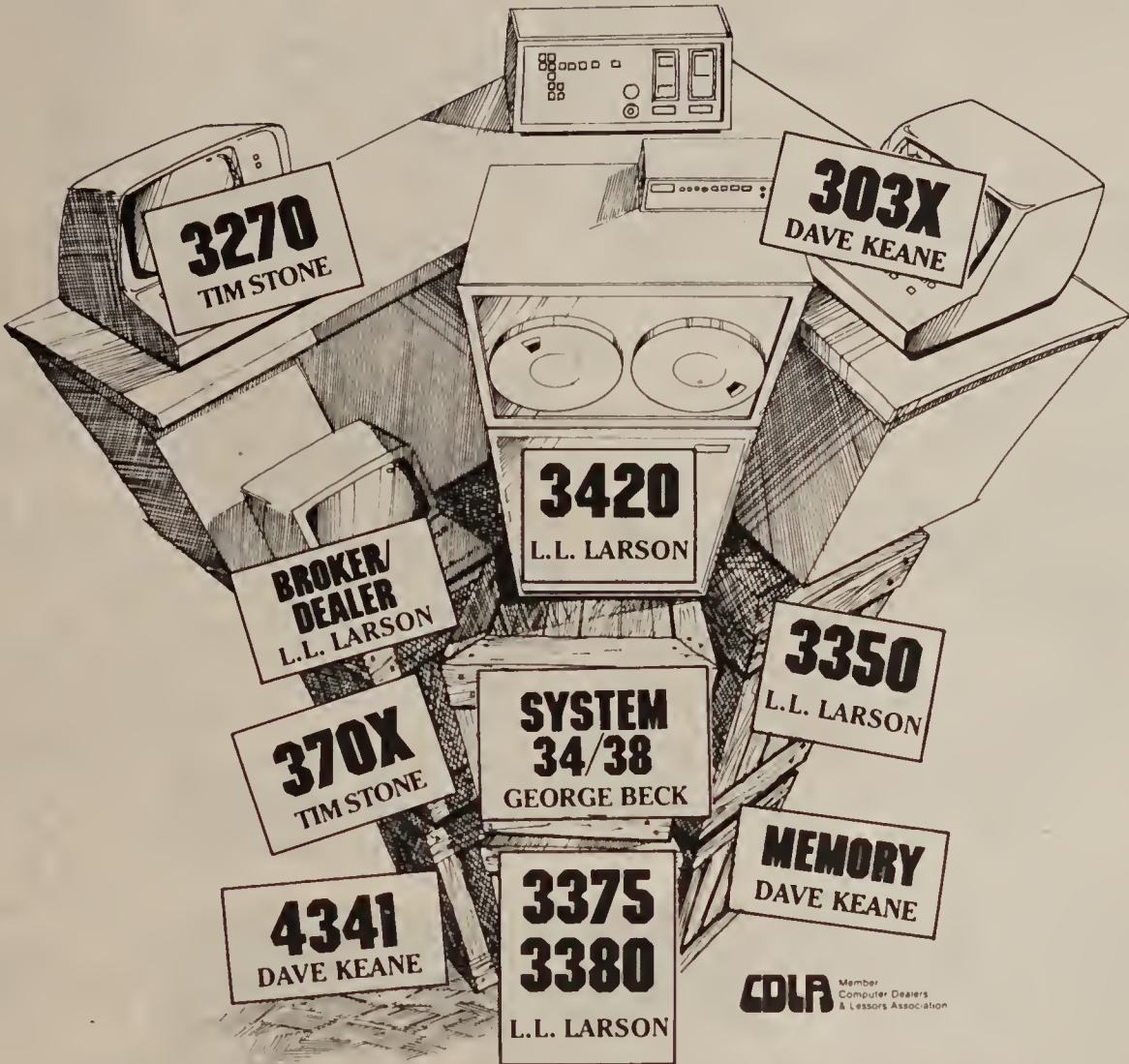
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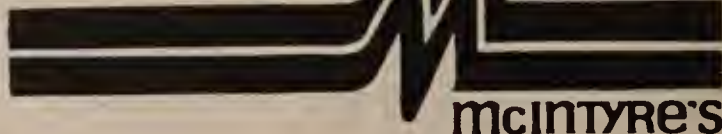
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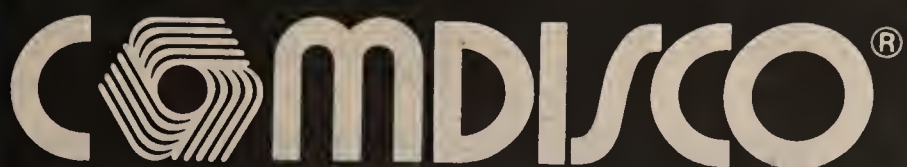
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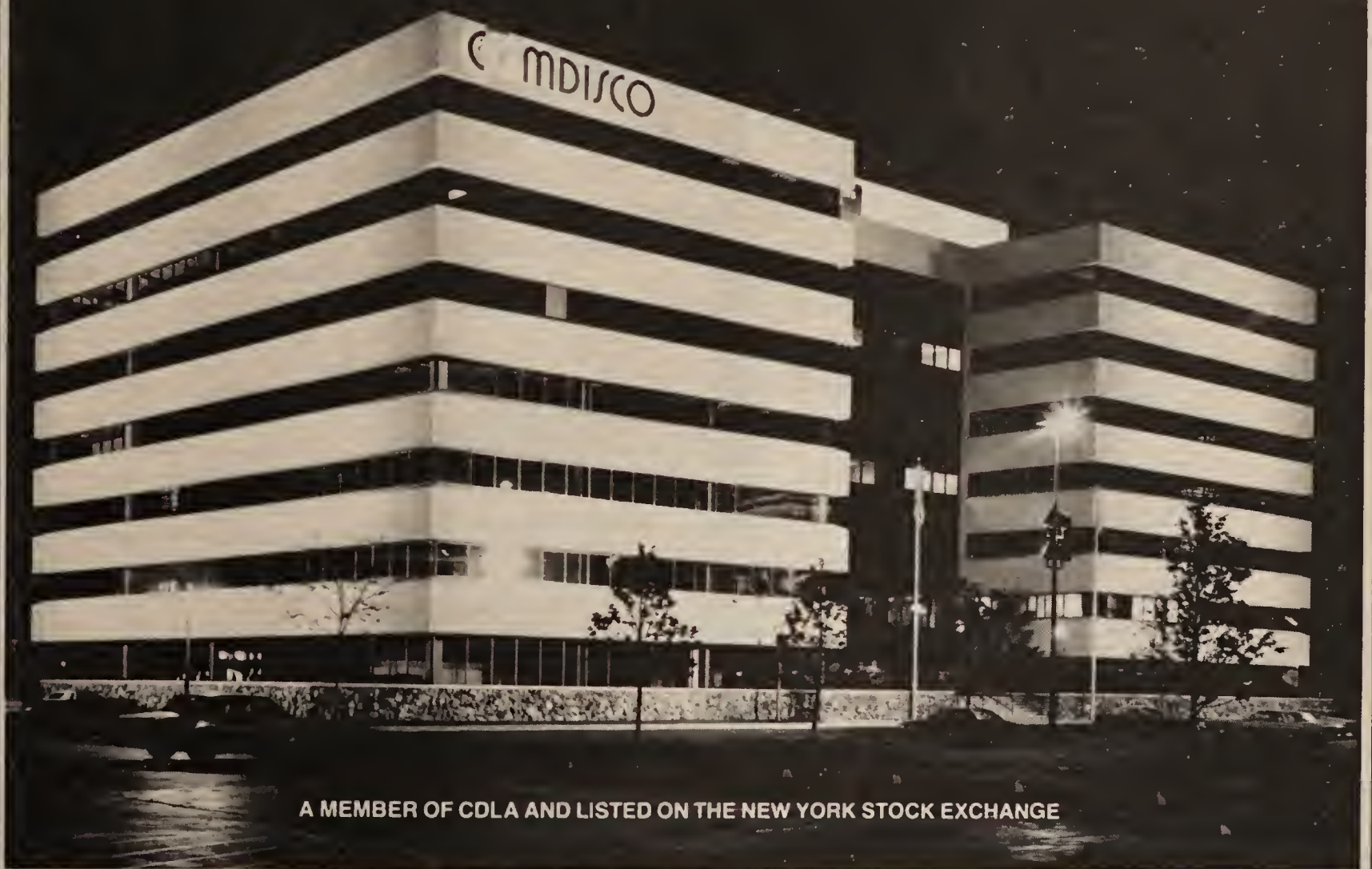
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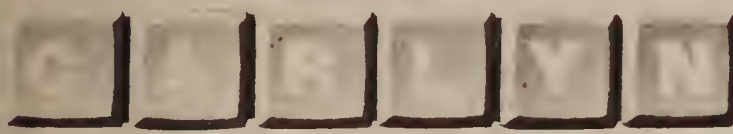
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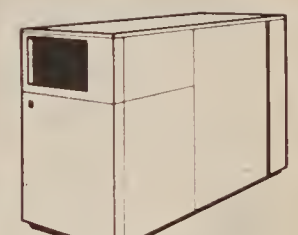
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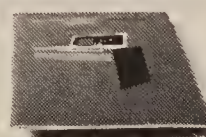
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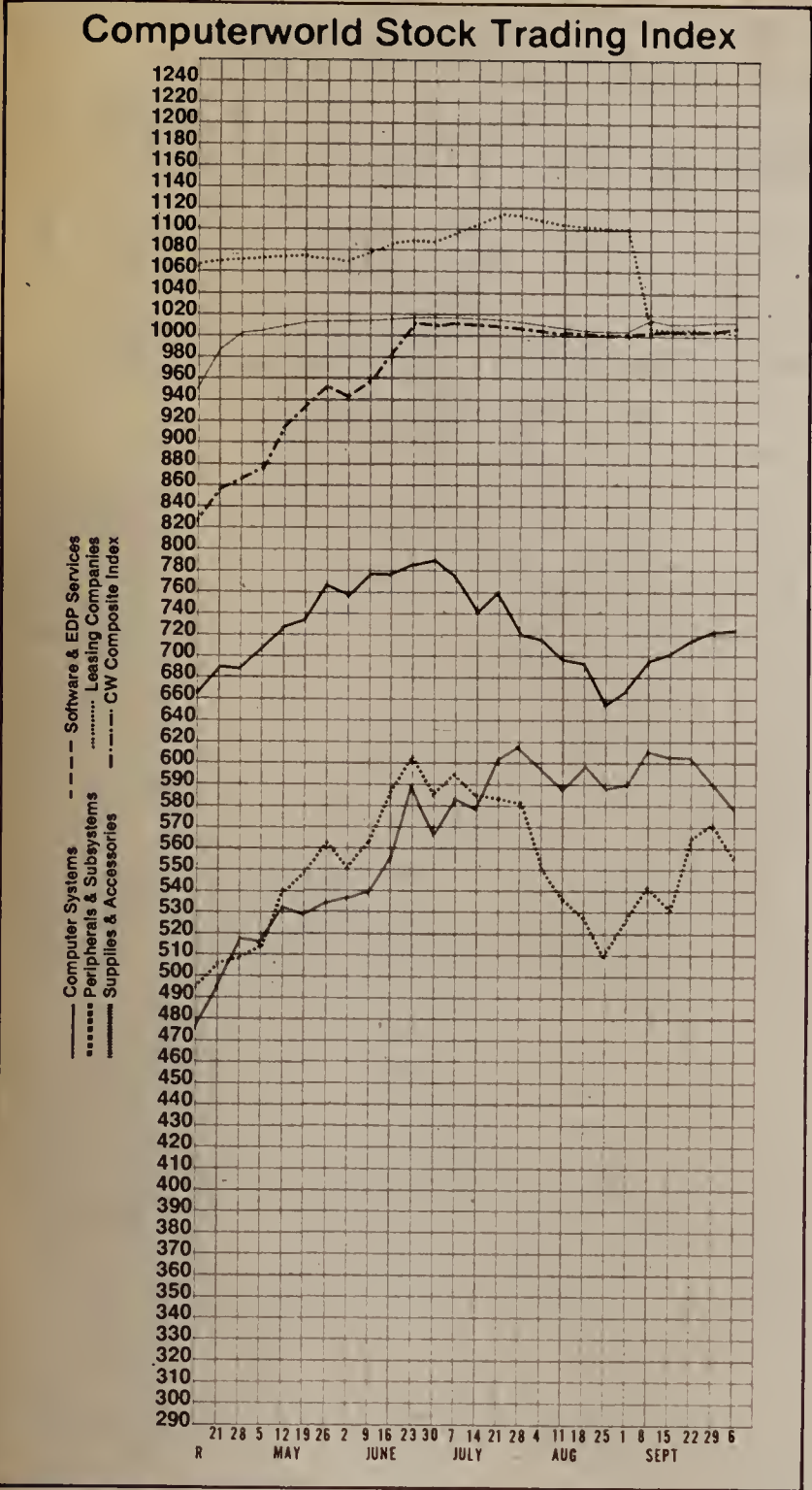
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| Computerworld Stock Trading Summary | | | | | | | | | |
|----------------------------------------------------------------------------------------------|---------------|------------|------------|------------|----------|----------|------------|----------|----------|
| TRADE QUOTES | | | | | | | | | |
| CLOSING PRICES WEDNESDAY, OCTOBER 5, 1983 | | | | | | | | | |
| All statistics compiled, computed and formatted by TRADE QUOTES, INC. Cambridge, Mass. 02139 | | | | | | | | | |
| COMPUTER SYSTEMS | | | | | | | | | |
| SYMBOL | 1982-83 RANGE | 1983 CLOSE | 1983 OCT 5 | WEEK CHNGE | WEEK NET | WEEK PCT | WEEK CHNGE | WEEK NET | WEEK PCT |
| ALPHA MICROSYSTEMS | 12-24 | 14 | | -2 1/4 | -13.8 | | | | |
| ALUCS COMPUTER SYST | 9-28 | 9 3/4 | | + 1/4 | +2.6 | | | | |
| ANDRILL CORP | 9-30 | 18 1/2 | | -1 1/4 | -6.3 | | | | |
| APPLE COMPUTER INC | 23-63 | 22 1/2 | | - 3/8 | -1.6 | | | | |
| AT&T | 60-70 | 65 1/2 | | + 1/8 | +0.1 | | | | |
| BURROUGHS CORP | 20-58 | 52 5/8 | | -1 1/2 | -2.7 | | | | |
| COMPUTER AUTOMATION | 7-17 | 8 | | + 5/8 | +8.4 | | | | |
| COMPUTER CONSOLES | 8-26 | 19 1/4 | | - 3/8 | -1.8 | | | | |
| CONTROL DATA CORP | 21-62 | 51 1/2 | | + 1/2 | +0.9 | | | | |
| CONVERGENT TECHNOL | 22-41 | 22 1/8 | | -2 3/4 | -11.0 | | | | |
| CRAY RESEARCH INC | 20-52 | 44 1/2 | | - 1/8 | -0.2 | | | | |
| DATA GENERAL CORP | 20-82 | 75 | | -5 | -6.2 | | | | |
| DATAPoint CORP | 11-38 | 27 | | +1 3/8 | +5.3 | | | | |
| DIGITAL EQUIPMENT | 62-132 | 102 | | -4 | -3.7 | | | | |
| ECCO INC | 6-16 | 14 3/4 | | + 1/8 | +0.8 | | | | |
| ELECTRONIC ASSOC. | 5-15 | 7 1/4 | | -5 1/2 | -43.1 | | | | |
| FLOATING POINT SYST | 16-44 | 35 | | - 1/8 | -0.3 | | | | |
| FOXBORO | 22-47 | 36 3/4 | | +1 7/8 | +5.3 | | | | |
| GENERAL AUTOMATION | 3-18 | 10 3/4 | | - 1/2 | -4.4 | | | | |
| Gould INC | 31-44 | 32 5/8 | | + 1/2 | +1.5 | | | | |
| HARRIS CORP | 20-51 | 37 3/4 | | -1 | -2.5 | | | | |
| HEWLETT PACKARD CO | 22-48 | 42 | | -1 1/4 | -2.8 | | | | |
| HONEYWELL INC | 60-127 | 125 1/2 | | +1 1/2 | +1.2 | | | | |
| IBM | 57-131 | 131 1/8 | | +2 3/8 | +1.8 | | | | |
| IBM SYSTEMS INC | 5-14 | 7 3/4 | | - 3/4 | -8.8 | | | | |
| LANIER BUSINESS PROD | 12-21 | 19 1/4 | | - 1/2 | -2.5 | | | | |
| RAY-COM INC | 22-35 | 25 3/4 | | -1 1/4 | -4.6 | | | | |
| MADISON COMP SYST | 2-5 | 7/8 | | 0 | 0.0 | | | | |
| MANAGEMENT ASSIST | 7-18 | 11 1/4 | | + 3/4 | +7.1 | | | | |
| MATSUSHITA ELECT (ADR) | 47-77 | 77 3/8 | | +2 5/8 | +3.5 | | | | |
| MIDJOURN COMPUTER SYS | 6-16 | 10 3/8 | | -2 3/8 | -18.6 | | | | |
| SHAW-WALKER DATA SFT | 10-19 | 15 | | + 7/8 | +6.1 | | | | |
| MOTOROLA INC | 82-148 | 144 1/2 | | -1 1/2 | -1.0 | | | | |
| UNIT SEMICONDUCTOR | 22-60 | 54 5/8 | | -2 3/8 | -4.1 | | | | |
| PERKINS | 39-130 | 130 | | +1 3/4 | +1.3 | | | | |
| PERKINS ELMER | 17-37 | 35 1/2 | | + 3/8 | +1.0 | | | | |
| PERKINS COMPUTER INC | 11-20 | 16 7/8 | | + 5/8 | +3.5 | | | | |
| PERKINS CORP | 21-46 | 46 | | 0 | 0.0 | | | | |
| TANDEM COMPUTERS INC | 14-37 | 36 1/2 | | +1 1/8 | +3.1 | | | | |
| TANDEM CORP | 37-65 | 39 1/8 | | + 5/8 | +1.6 | | | | |
| TELEVIDEO SYSTEMS | 16-41 | 17 7/8 | | +1 | +5.9 | | | | |
| TERAS INSTRUMENTS | 71-176 | 116 | | - 3/8 | -0.3 | | | | |
| VICTOR GRAPHICS INC | 3-14 | 3 1/8 | | - 1/2 | -13.7 | | | | |
| WANG LABS "B" | 13-42 | 35 7/8 | | +1 7/8 | +5.5 | | | | |
| WANG LABS "M" | 11-42 | 36 | | +1 3/4 | +5.1 | | | | |
| XEROX CORP | 35-50 | 45 1/8 | | +2 1/8 | +4.9 | | | | |
| LEASING COMPANIES | | | | | | | | | |
| ADOTHE FINANCIAL CP | 11-32 | 31 3/4 | | +2 | +6.7 | | | | |
| COMDISCO INC | 7-42 | 38 5/8 | | + 1/8 | +0.3 | | | | |
| CONTINENTAL INFO SYS | 3-16 | 12 1/4 | | -1 1/2 | -10.9 | | | | |
| DPF INC | 5-15 | 14 5/8 | | + 1/4 | +1.7 | | | | |
| L.S. LEASING | 18-47 | 39 | | -1 7/8 | -4.5 | | | | |
| SOFTWARE & EDP SERVICES | | | | | | | | | |
| ADVANCED COMP TECH | 1-8 | 4 | | - 1/2 | -11.1 | | | | |
| ADVANCED SYSTEMS INC | 6-22 | 17 | | - 3/4 | -4.2 | | | | |
| AUS COMPUTERS INC | 7-32 | 23 1/2 | | -2 | -7.8 | | | | |
| AMERICAN SOFTWARE | 21-31 | 27 3/4 | | 0 | 0.0 | | | | |
| ANACOMP INC | 9-23 | 9 7/8 | | 0 | 0.0 | | | | |
| ANALYSTS INTL CORP | 5-20 | 15 1/4 | | +2 1/4 | +17.3 | | | | |
| APPLIED DATA RES. | 8-37 | 30 7/8 | | +1 5/8 | +5.5 | | | | |
| ASA COMPUTER SYSTEMS | 5-21 | 19 3/4 | | -1 | -4.8 | | | | |
| ASTRODYNE CORP INC | 1-7 | 4 1/8 | | - 1/4 | -5.7 | | | | |
| AUTOMATIC DATA PROC | 21-44 | 37 3/8 | | + 3/8 | +1.0 | | | | |
| CGA COMPUTER ASSOC | 5-16 | 16 3/8 | | + 7/8 | +2.4 | | | | |
| COMPUTER ASSOC INT'L | 6-35 | 29 | | - 7/8 | -2.9 | | | | |
| COMPUTER HORIZONS | 8-20 | 12 | | + 1/2 | +4.3 | | | | |
| COMPUTER NETWORK | 4-10 | 7 1/8 | | - 1/4 | -3.3 | | | | |
| COMPUTER SCIENCES | 11-23 | 17 5/8 | | - 3/8 | -2.0 | | | | |
| COMPUTER TASK GROUP | 8-22 | 15 3/4 | | - 1/4 | -1.5 | | | | |
| COMPUTER USAGE | 2-22 | 16 2/4 | | - 1/4 | -1.4 | | | | |
| COMPUTONE SYSTEMS | 7-38 | 7 1/2 | | + 1/4 | +3.4 | | | | |
| COMSERV CORP | 7-20 | 8 1/4 | | -1 | -10.8 | | | | |
| COMSHARE | 7-13 | 10 3/4 | | 0 | 0.0 | | | | |
| CULLINET SOFTWARE | 12-50 | 44 1/2 | | -2 1/4 | -4.8 | | | | |
| CYCAR SYSTEMS INC | 9-27 | 20 1/2 | | 0 | 0.0 | | | | |
| ELECTRONIC DATA SYST | 10-42 | 39 1/2 | | + 3/8 | +0.9 | | | | |
| HOGAN SYSTEM INC | 27-53 | 48 1/4 | | - 1/2 | -1.0 | | | | |
| GENERAL ELECTRIC CO | 45-58 | 55 3/8 | | +3 1/8 | +5.9 | | | | |
| GTE CORP | 38-48 | 45 1/4 | | +1 1/2 | +3.4 | | | | |
| INFORMATICS INC | 10-34 | 26 1/8 | | -1 | -3.6 | | | | |
| INFOTRON SYSTEMS COR | 25-43 | 33 3/4 | | -1 1/4 | -3.5 | | | | |
| KEANE ASSOCIATES | 4-15 | 10 | | - 1/4 | -2.4 | | | | |
| LOGICON | 8-30 | 29 1/4 | | +1 1/2 | +5.4 | | | | |
| MCI COMMUNICATIONS | 15-34 | 15 5/8 | | -2 1/2 | -13.7 | | | | |
| MNGT SCI AMER INC | 8-33 | 32 1/2 | | + 1/4 | +0.7 | | | | |
| MATHEMATICAL APP GRP | 12-22 | 15 1/2 | | + 1/2 | +3.3 | | | | |
| MICROM SYSTEMS INC | 25-50 | 46 1/2 | | - 1/4 | -0.5 | | | | |
| MONCHIK-WEBER CP | 10-22 | 12 | | -2 3/4 | -18.6 | | | | |
| NA IDOL DATA CORP | 5-26 | 16 5/8 | | - 5/8 | -3.6 | | | | |
| ON-LINE SOFTWARE INT | 19-27 | 21 | | -2 1/2 | -10.6 | | | | |
| PANOSOPHIC SYSTEMS | 8-30 | 23 7/8 | | -1 1/2 | -5.9 | | | | |
| PLANNING RESEARCH | 6-21 | 15 1/2 | | - 1/8 | -0.7 | | | | |
| POLICY MGMT SYST CP | 15-35 | 29 3/4 | | - 1/8 | -0.4 | | | | |
| PROGRAMMING & SYS | 1-8 | 6 7/8 | | - 1/2 | -6.7 | | | | |
| REYNOLDS & REYNOLD | 17-53 | 41 3/4 | | -3 1/4 | -7.2 | | | | |
| SEI CORP | 11-34 | 31 1/2 | | - 3/4 | -2.3 | | | | |
| SHARED MEDICAL SYST | 13-43 | 40 1/2 | | -2 7/8 | -6.6 | | | | |
| SCIENTIFIC COMPUTERS | 8-14 | 12 | | + 1/4 | +2.1 | | | | |
| SOFTWARE AG | 5-17 | 10 3/4 | | + 7/8 | +7.5 | | | | |
| TYNSHARE INC | 12-30 | 18 | | -2 5/8 | -12.1 | | | | |
| URS CORP | 5-18 | 13 3/4 | | - 5/8 | -4.3 | | | | |
| WVLY CORP | 7-17 | 12 7/8 | | +1 1/4 | +10.7 | | | | |
| COMPONENTS | | | | | | | | | |
| ADVANCED MICRO DEV | 13-35 | 31 1/8 | | - 5/8 | -1.9 | | | | |
| ADV'D SEMICONDUCTOR | 12-34 | 31 3/4 | | +1 1/2 | +4.9 | | | | |
| ANALOG DEVICES INC | 18-42 | 40 1/8 | | - 1/4 | -0.6 | | | | |
| ANALOGIC CORP | 23-27 | 23 | | -2 1/2 | -9.8 | | | | |
| APPLIED MAGNETICS CP | 19-37 | 30 3/8 | | -1 7/8 | -5.8 | | | | |
| ATRADYNE | 14-37 | 36 1/4 | | -1 | -2.6 | | | | |
| PERIPHERALS & SUBSYSTEMS | | | | | | | | | |
| AM INTERNATIONAL | 2-7 | 3 3/4 | | -1 1/8 | -23.0 | | | | |
| ANDERSON JACOBSON | 9-26 | 11 7/8 | | + 1/8 | +1.0 | | | | |
| ANTIC-TROL TECHNOLOGY | 8-29 | 23 | | - 1/4 | -1.0 | | | | |
| BANCTEC INC | 7-33 | 14 3/4 | | - 1/2 | -3.2 | | | | |
| DEEIVE INT'L | 4-15 | 9 1/2 | | - 1/4 | -2.5 | | | | |
| BOLT-BERANEK & NEW | 9-60 | 57 1/4 | | +2 3/4 | +5.0 | | | | |
| CANEX CORP | 2-4 | 2 1/4 | | 0 | 0.0 | | | | |
| CENTRONICS DATA COMP | 5-28 | 24 3/4 | | - 1/4 | -1.0 | | | | |
| CETEC CORP | 4-12 | 11 1/8 | | + 1/4 | +2.2 | | | | |
| COGNITRONICS | 2-20 | 9 1/4 | | - 3/4 | -7.5 | | | | |
| SUPPLIES & ACCESSORIES | | | | | | | | | |
| AMERICAN BUS PRODS | 11-33 | 32 1/2 | | - 1/4 | -0.7 | | | | |
| BARRY WRIGHT | 13-31 | 30 1/8 | | - 1/8 | -0.4 | | | | |
| DUPLEX PRODUCTS INC | 12-26 | 25 1/8 | | + 3/8 | +1.5 | | | | |
| ENNIS BUS. FORMS | 6-25 | 23 1/2 | | + 3/8 | +1.6 | | | | |
| 3P COMPANY | 49-90 | 85 1/2 | | +2 1/4 | +2.7 | | | | |
| MOORE CORP LTD | 26-51 | 45 1/4 | | -3 1/4 | -6.7 | | | | |
| STANDARD REGISTER | 11-34 | 32 | | 0 | 0.0 | | | | |
| WALLACE BUS FORMS | 11-30 | 27 | | + 3/8 | +1.4 | | | | |

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